Parks 19 (Nov. 6)

THE

75023

ELECTRICAL WORLD:

A WEEKLY REVIEW OF CURRENT PROGRESS IN ELECTRICITY AND ITS PRACTICAL APPLICATIONS.

VOLUME XXX.

FROM JULY 3 TO DECEMBER 25, 1897.

NEW YORK:

THE W. J. JOHNSTON COMPANY,

253 BROADWAY.

INDEX TO VOLUME XXX.

GENERAL ALPHABETICAL INDEX.

NOTE.—*Entries from the Digest of Current Electrical Literature are indicated by D. (Digest) and D. R. (Digest Reference). Illustrated articles are indicated by *.*

A

Absorption of electromagnetic waves. By Righi, (D.), 253, 422.
Acceleration and braking. By Potter, (D.) 508; Summers, (D.) 421.
  Chicago tests, (D.) 508.
  Schenectady tests, (D.) 421.
Accumulators.
  Boat equipped with, at Hamburg, (D. R.) 706.
  Calculation of capacity for variable currents. By Liebenow, (D.) 254.
  Capacity and current, Relation between. By Penkert, (D. R.) 198, 227.
  Construction. By Fitz Gerald, (D.) 461, 540, 595, 678, 708; Wade, (D.) 460, 540.
  Digoine plate, (D.) 646.
  Lead, theory of. By Elbs and Schoenherr, (D.) 394; Liebenow, (D.) 394; Loeb, (D. R.) 103.
  Machine for making plates, (D.) 708.
  Management of. By Ansell, (D.) 338.
  Manganese undesirable. By Knorre, (D. R.) 423.
  Manufacture of, 514*.
  New. By Tommasi, (D.) 679.
  Pescetto, Lightness, (D.) 707.
  Progress of twenty-five years. By Epstein, (D. R.) 708.
  Soluble electrodes, (D.) 254.
  Stage use of. By Bissing, 536.
  Telegraph work. By Aydon, (D.) 462.
  Theory of. By Foerster, (D.) 47.
  Tudor, for rapid charging. By Blanchon, (D.) 170, 365; (D. R.) 282.
  Voltmeter switch for, (D.) 252.
  Werner cadmium, (D.) 768.
  (See also Central stations; Railways, electric.)
Acetic acid, Electric conductivity of tri-chloric. By Rivals, (D. R.) 678.
Actinometers, Electro-chemical experiments. By Rigollot, (D.) 540.
Aerial weather station, Permanent. By McTighe, (D.) 541.
Agriculture, Electric energy in, (D.) 336; By Renaud, (D.) 252.
  Amherst experiments, (D.) 769.
  Germany, (D.) 45, 76, 308, 457.
Air, Electrification of. By Kelvin, (D. R.) 136; De Fouvielle, (D.) 511; Le Cadet, (D.) 618.
  Electrification by uranium. By Beattie, (D.) 103.
  Liquid, Possibilities in electrical work. By Thomson, 99.
Air ships.
  Electrically driven, (D.) 363.
  Liquid air and ships. By Taylor, (D.) 565.
  Western States, 350.
Alcohol, Electrolytic dissociation, (D.) 768.
Alcohols, Artificial aging of, Broyer and Petit method, (D.) 339.
Alkali metals, Penetrative power of X-rays. By Marangoni, (D.) 77.
Alkalis, Electrolytic processes. By Kershaw, (D.) 646.
Alkaline chlorides, Electrolysis of. By Hulin, (D.) 136.
Alkaline salts.
  Analysis by means of telephone. By Erdmann, (D.) 365.
  Electrolysis of fatty acids. By Rohland, (D. R.) 365.
Allfree automatic engines, 80, 174*.
Alternating-current arcs. (See Arcs.)
Alternating-current circuits.
  Diagrams of instantaneous voltage in. By Allu, (D.) 281.
  Power in. By Houston and Kennelly, 63, 300.
Alternating-current curves. By Armagnat, (D.) 338, 394; Eichberg, (D.) 394.
  Determining. By Kubler, (D.) 596.
  Recording. By Duddell, (D.) 363.
Alternating-current machinery. By Colard, (D.) 507; Houston and Kennelly, 8*, 63, 194, 244, 300, 358, 452, 532, 581, 638, 727*; Raymond, (D.) 196.
  Thickness of sheet metal used. By Loppe, (D.) 15.
Alternating currents.
  Concentric cables. By Price, (D.) 103.
  Danger limit, (D.) 511.
  Development, 1831-1872. By Mordey, (D.) 707.
  Effective value. By Barnett, (D.) 678.
  Measurement of. By Rowland, (D.) 738.
  Optical method for studying. By Abraham and Buisson, (D.) 254, 564.
  Rectifying. By Graetz, (D.) 197, 226.
Alum, Solutions of. By Jones and Mackay, (D.) 679.
Aluminum.
  Cheaper than brass, 565.
  Conductors. By Kershaw, (D.) 309.
  Manufacture at Niagara Falls, 13.
  Minet's process, (D.) 137.
  Plating, (D.) 365.
  Production, World's, (D.) 227.
American Association for the Advancement of Science, 1, 3, 44, 99.
American Electric Heating Co., Electrical fittings, 228*.
American Electrical Works' clam bake, 258*.
American Electro-Therapeutic Association, 272.
American Institute Electrical Engineers.
  Greenacre meeting, 60, 113, 126.
  Meetings of Dec. and Jan., 761.
American Street Railway Association, Convention, 456, 493, 496*.
Ammeter shunt. By Sheldon, (D.) 680.
Ammeters.
  Cherry Electric Works, 339*.
  Differential, on electric railways, 340.
  Registering. By Arnoux and Chauvin, (D.) 18.
  Thermic mercury. By Camichel, (D. R.) 338.
Amperemeters, Contact surfaces for. By Troll, (D.) 708.
Anderson switches, 513*.
Annunciator, Star, 81*.
Annunciator and advertising cabinet, 106*.
Arc lamp reflectors, (D.) 167.
Arc lamps. By Richard, (D. R.) 135.
  Alternating current.
    General Electric, new, 542.*
    Puritan, 428*.
    Regulation of, 65; By Claude, (D.) 15, 135.
  Aron amalgam arc lamp for spectroscopic purposes, (D.) 462.
  Aron, with mercury arc. By Gumlich, (D.) 47.
  Bardon alternating-current, (D. R.) 101.
  Bell hanger, 228*.
  Constant potential, (D. R.) 307.
    Bardon system, (D. R.) 562.
  Davy and Davis alternating-current, enclosed, (D.) 593.
  Direct-current. By Hesketh, (D.) 457.
  Enclosed.
    Davy, (D.) 675.
    Diehl improved, 680*.
    English, 713*.
    History. By Nichols, (D.) 101.
    Koerting & Mathiesen, (D.) 457.
    Tests of alternating-current lamps, 693, 695*.
  Fountain lamps, 229*.
  Henrion, (D. R.) 735.
  Mechanism of. By Watts, (D.) 421, 457, 537.
  Photo-engraving, 710*.
  Suspension, Reel in poles. By Rentzsch, (D.) 224.
Arc-light meter, 199*.
Arc lighting.
  Progress since 1878, 209; By Crompton, (D. R.) 705.
  Underground circuits. By Sharpsteen, (D. R.) 707.
  (See also Central stations.)
Arc spectra, Photographic studies. By Foley, (D.) 365.
Arcs. By Hesketh, (D.) 457.
  Alternating current.
    Efficiency of. By Burnie, (D.) 564.
    Experiments. By Smith, (D.) 565.
    Phenomena. By Hay, (D.) 253.
    Photometric measurements. By Wedding, (D.) 735.
  Arc and spark. By Guillaume, (D.) 169.
  Constant potential. By Rau and Vaughn, (D.) 307.
  Counter E. M. F. By Herzfeld, (D.) 675; Blondel, (D.) 230, 536; Bonham and Almert, (D.) 565; Taylor, (D.) 326.
  Light efficiency. By Claude, (D.) 617.
  Relations between arc curves and crater ratios. By Mrs. Ayrton, (D.) 307.
Armature discs.
  Manufacture of, 711*.
  Stacking by machine. By Rice, (D. R.) 196.
Armatures.
  Balancing rig. By Hobart, 505*.
  Burned-out, due to defective lamps. By Woolston, (D.) 75.
  Construction of coils. By Baxter, (D.) 75, 363; (D. R.) 224, 307.
  Dies for punching cores. By Baxter, (D. R.) 421.
  Force exerted on iron. By Desombre, (D.) 735.
  Insulation of. By Baxter, (D. R.) 135.
Armatures. (Continued.)
  Iron losses in teeth. By Breslauer, (D.) 75.
  Reaction, with three-phase generators. By Braun, (D.) 75.
  Short circuits, Cause of. By Baxter, (D. R.) 75.
  Slot and tunnel. By Du Bois, (D.) 307; Baumgardt, (D. R.) 391; Bailey, (D.) 537, 705; Menges, (D. R.) 675, 766.
  Teeth, with and without. By Dobrowolsky, (D.) 224, 279; Fleischmann, (D.) 391; Menges, (D.) 617.
  Windings.
    Drum armatures. By Baxter, (D.) 167.
    Open circuit. By Eichberg, (D.) 507.
    Right and left-handed. By Hawkins, (D.) 363.
Army, Electrical engineers in, 30, 44.
Arsenic and the noble metals, (D.) 137.
Arterial tension, High-frequency currents on. By Moutier, (D.) 339.
Artillery, Applications of electricity. By Lavergne, (D.) 308.
Asbestos, Manufacture. By Shilling, (D. R.) 709.
Ash cars, cheap. By Hobart, 278*.
Astoria Hotel plant, 751*.
Atmospheric electricity, Origin, variations and perturbations. By Brillouin, (D.) 364; Cancani, (D. R.) 78.
Ayrton, W. E., 249*.

B

Bakersfield power plant, 412*.
Balancing rig for armatures. By Hobart, 505*.
Ball Engine Co.
  Engine governor, 228*.
  Single-cylinder engine, 512*.
Ballooning, Scientific, (D. R.) 541.
Barrels, Steel, electrically welded, (D.) 19, 48, 60, 462.
Batteries.
  Atmospheric action, new battery. By Warren, (D.) 595.
  Cadmium cell.
    Irregularities in temperature. By Cohen, (D.) 769.
    Specifications for. By Jaeger, (D.) 596.
    Lists, (D.) 17.
  Callaud, Maintenance of. Davis, (D. R.) 138.
  Carbon. By Borchers.
  Carbon. By Borchers, (D.) 338; Case, (D.) 310.
    British patent. By Picard, (D.) 768.
    (See also below, Jacques.)
  Clark cells. By Spiers, Twyman and Waters, (D.) 708; Fischer, (D.) 511; Callendar, (D.) 564.
    Modification. By Callendar and Barnes, (D.) 366.
    On closed circuit. By Wulf, (D.) 366.
    Temperature variations. By Cooper, (D.) 737.
    Tests, (D.) 17.
  Coal gas. By Borchers, (D.) 226.
  Diminutive, Historical, 385*.
  Dry.
    Fortosec, 139.
    "O. K.," 739.
    Roche, 650.
  Jacques cell, 97*; By Thomson and Anthony, (D.) 737.
  Lelande, Modifications by Boettcher, (D.) 707.
  Pressure, Effect of, on E. M. F. of cells. By Claude, (D.) 460.
  Primary, Development. By Gatehouse, (D. R.) 707.
  Standard cell. By Fisher, (D.) 423.
  Thermo-electric. By Helleeg and Hall, (D.) 78; Reed, (D.) 78, 282, 510, 708; Anthony, (D.) 198, 282, 510, 708.
Battery jars.
  Improved form. By Randall, (D.) 79.
  Pegamoid, (D.) 395.
Bearings.
  Glass. By Marcillac, (D.) 48.
  Roller, Details of construction. By How, (D.) 645.
Bell hanger, Arc-light, 228*.
Bell ringing, Dynamo. By Francis, (D.) 511; Lee, (D.) 199; (D.) 282.
Bells.
  Multiple circuit. By Todd, (D. R.) 282.
  Water-tight, (D.) 596.
Belt transmitter, L. P. & D., 542*.
Bernard direct-current dynamos, 427*.
Bicycle, Motor tandem, (D.) 767.
Bicycle speed indicator. By Meylan, (D.) 564.
Binding machinery, Electric power operation. By Bishop, 406, 419*, 449*.

Bismuth, Hall effect in. By Van Everdingen, (D.) 17.
Blasting fuses. By Van Deth, (D.) 739.
Bleaching, Electric, (D.) 227.
  Electrolysis of sulphites. By Andreoli, (D.) 619.
  Kellner process, (D.) 563.
Blindness from electric light, (D.) 199, 228.
Bliss Company, Presses, 711*.
Block signals.
  Bond system, (D.) 104.
  Single-track railroads, Germany, (D. R.) 394.
Blodgett, George R. In memoriam, 765.
Boat propeller, Electric, New development, (D.) 706.
Boats, Electric, Accumulators, Hamburg, (D. R.) 706.
Boilers.
  Central station work. By Ross, (D.) 507.
  Standard, 514*.
Bolometer. By Kurlbaum, (D.) 227.
  Alternating-current circuit. W. P. Maycock, 104.
Book reviews.
  Coil and Current, or the Triumphs of Electricity. Henry Frith and W. S. Rawson, 139.
  Electric Railways and Tramways. Philip Dawson, 463.
  Electric Smelting and Refining. W. Borchers, 709, 770.
  Elements of Electro-Chemistry Treated Experimentally. Dr. Robert Lüpke, 770.
  Gas, Gasoline and Oil Vapor Engines. G. D. Hiscox, 770.
  International Text Book of Medical Electro-Physics and Galvanism. W. J. Herdman and others, 709.
  Johnston's Electrical and Street-Railway Directory for 1897, 255.
  Luce E. Raggi Röntgen. Oreste Murani, 709.
  Mechanical Arts Simplified. D. B. Dixon, 367.
  Mechanical Drawing and Machine Design, Easy Lessons in. J. G. A. Meyer, 565.
  Polarizing Photo-Chronograph. A. C. Crehore and G. O. Squire, 171.
  Poor's Manual of the Railroads of the United States, 565.
  Practical Electricity in Medicine and Surgery. G. A. Liebig, 709.
  Practical Management of Engines and Boilers. W. B. Le Van, 139.
  Theory of Electricity and Magnetism. A. G. Webster, 284.
Boston, Electrical industries in 1868. By Edison. (D.) 648.
Boston Subway, 272, 294; (D. R.) 280, 308; By Talbot, 295*.
Bowling Green Building, Electrical features, 58, 66*.
Brakes, Electric, on railroads, (D.) 252, 339.
Bridges, Electric operation.
  Duluth. By Woodbridge, 7*.
  Toronto, (D.) 308.
British Association for the Advancement of Science, Toronto meeting, 119, 249, (D.) 339.
Broiler, Electric, 285*.
Bronzes and brasses, Analysis of. By Hollard, (D. R.) 137.
Brooklyn Bridge.
  Lighting equipment, 129*.
  Through cars, 237, 241.
Brussels Exhibition. By Scott, (D. R.) 310.
  Electric railway at, 684.
Bryant fusible socket, 105*.
Budish & Yudizky hat manufactory, Electricity in, 115*.
Buffalo reducing wheel, 369*.
Buildings.
  Bowling Green, N. Y., Electrical features, 58, 66*.
  Electric plant in. By Pattison, (D.) 198.
  New York Life, Power plant, 31*.
Bullock direct-connected multipolar generator, 684*.
Bundy separator, 682*.
Business outlook, August, 181.

C

C & C Electric Co., Motors, 712*.
Cable railways.
  Kansas City, Electric operation. By Grover, (D. R.) 538.
  Washington, D. C., Power house destroyed, 406*, 417.
Cables.
  Capacity of long cables. By Dearlove, (D.) 338; Young, (D.) 511.
  Capacity of two-wire cable. By Patterson, (D. R.) 618.
  Measuring electrostatic capacity. By Murphy, (D.) 647.
  Paper, New type. By Domine, (D.) 677.
  Testing. By Savage, (D.) 338; Tobler, (D.) 511.
  (See also Submarine cables.)
Cables in a tank, Determining the relative positions of. By Taylor, (D. R.) 48.
Cableways, Electric. By Lamb, (D. R.) 594.
Cadmium solutions. By Gordon, (D. R.) 679.
Calcium amalgam. By Feree, (D.) 338.
Calcium carbide.
  Furnace, Regnoll system, (D.) 171.
  Geneva factory, (D. R.) 460, 595.
  New use for. By Chuard, (D.) 80.
  Production, with phosphorus. By Jougdrain, (D.) 137.
Calling signals for elevator service, 270*.
Canadian Electrical Association, (D. R.) 19.
Canals, Electric towage, (D.) 336, 457, 507, 526, 594.
  France. By Dupuy, (D.) 392; Miron, (D.) 457.
  German cableway, (D.) 337.
  Schatz system, (D.) 363.
Cannon, Electric battery for firing of. By Hobart, (D.) 199.
Capacity determination. By Von Lang, (D.) 282.
  Measuring capacity with a balance. By Lang, (D.) 461.
Capillary electrometer. By Behn, (D.) 310, (D. R.) 678.
Capillary reactions. By Nernst, (D.) 136.
Capital Traction Co., Washington, Electric system proposed, 406, 417.
Car fares in Indianapolis, 116.
Car heaters, Electric, Status of, (D. R.) 309.
Car heating, Electric. By Damson, (D.) 645.
Car lighting.
  Accumulators, France. By Sartianx, (D. R.) 457.
  Electric, Progress made. By Buettner, (D.) 196.
  Gas and electricity, (D.) 336; By Gordes, (D.) 363.
  Jura-Simplon Railway. By Jacquin, (D. R.) 252, 421.
  "Lake Shore Limited," 561*, (D.) 644.
  Various systems. By Schili, (D. R.) 336.
Car pits in New Orleans, (D. R.) 308.
Car truck, Electric, 469*.
Car wheels, Evolution of, (D.) 538.
Carbide patent, (D. R.) 254.
Carbon.
  Conductivity of. By Callier, (D.) 198; 393.
  Reaction in electrolysis. By Vogel, (D.) 365.
Carbon coherers. By Brown, (D.) 736.
Carbon compounds, Electric absorption of nitrogen. By Berthelot, (D.) 78.
Carbon detector or receiver for Hertz waves. By Smith, 588.
Carbon electrodes, 92.
Carbons.
  Arc lamp, Slotted, (D.) 45.
  Duty on, 456, 574.
  Strauss long lived, (D.) 766.
Carborundum case, Decision in, 129.
Card Electric Co., Factory motors, 284*.
Cardew earthing device, 49*.
Carlisle & Finch electrical toys, 396*.
Carriages, Traction resistance of, (D.) 645.
  (See also Motor vehicles.)
Cars.
  Ash, Cheap. By Hobart, 278*.
  Serpolet steam system, (D. R.) 197.
Cars, Electric.
  Construction of. By Dunning, (D. R.) 509.
  Controlling. (See Controllers, Railway.)
  Dynagraph car, Chicago, (D.) 508.
  France. By Thomien, (D.) 676.
  Losses from stoppages of. By Hering, (D.) 76.
  Mason City, Ia., 465*.
  Motor cars vs. electric locomotives. By Baxter, Jr., 132.
  Patton motor car, 629, 640*.
  San Francisco. By Foster, (D.) 308.
  Testing car, St. Louis, (D. R.) 538.
Castings, Method of making, 4.
Cathode rays. By Maltezos, (D.) 17; Thomson, (D. R.) 510; Wiedemann and Schmidt, (D.) 169.
  Colorations of salts. By Abegg, (D. R.) 678; Goldstein, (D. R.) 136.
  Deflection. By Jaumann, (D. R.) 281; Schimdt, (D.) 678.
  Deviation by a magnet. By Precht, 726*.
  Discharge of. By Battelli and Garbasso, (D.) 281.
  Identity with Röntgen rays. By Battelli, (D.) 102.
  Magnetic deflection. By Kaufmann, (D.) 198, 563; Metz, (D.) 169, 646.
  Mass of electrons. By Wiechert, (D.) 337.
  Mutual influence. By Bernstein, (D.) 678.
  New form of discharge. By Wood, (D.) 170.
  Properties of simple rays. By Deslandres, (D.) 46.
  Researches by Goldstein, (D. R.) 253.
  Resonance of tube. By Deslandres, (D.) 364.
  Salts changed by. By Abegg, (D.) 364.
  Varieties of. By Thompson, (D.) 337.
  Velocity of. By Majorana, (D.) 736.
Cells. (See Batteries.)
Central stations.
  Accumulators in. By Appleton, (D.) 102, 135; Johnson, (D.) 16; Sharpe, (D.) 102.
  Germany, Statistics, 155.
  Management of. By Ansell, (D.) 338.
  Windsor, Eng., (D. R.) 197.
  Zurich. By Schroeder, 731*.
  Allegheny County Light Co., Pittsburg. By Thomas, 612*.
  Austria, Data, 1896, (D.) 509.
  Bakersfield, Cal., 412*; By Schuyler, (D.) 336.
  Boilers. By Ross, (D.) 507.
  Bolton, Eng., Description. By Lomas and Gunton, 2, 5*.
  Boston, West End Ry. Co., (D. R.) 767.
  Bradford, (D. R.) 539, 736.
  Brussels, (D. R.) 280; By Pierard, (D. R.) 135.
  Budapest polyphase. By Jehl, (D.) 16.
  Canton, Pa., 440-volt plant. By Perkins, 42*.
  Care and oversight of. By Smith, (D. R.) 196.
  Cheltenham, (D. R.) 539.
  Chicago, Remodeled, (D.) 594.
  Chicago Edison plant. By Lomas and Gunton, (D. R.) 46.
  Columbus, Ga. By Boileau, 275*.
  Combined lighting and traction. By Van Vloten, (D.) 46, (D. R.) 197.
  Costs. (See below, Economy; also, Charging for electrical energy.)
  Croyden, (D. R.) 337.
  Design and construction of. By Arnold, (D.) 224; Dow, (D.) 422, 618; Macomber, (D. R.) 102.
  Detroit, Report, (D. R.) 459.
  Development, Tendency of, 673, 703, 759.
  Distribution of electrical energy. By Wordingham, (D.) 676, 706; Boot, (D. R.) 768.
  Douglas, Eng., Proposed, (D. R.) 457.
Central stations. (Continued.)
  Economy. By Babcock, (D.) 77.
  Construction costs. By Taylor, (D. R.) 705.
  England and America, Comparison. By Lomas, (D.) 767.
  Estimating cost of electrical energy. By Herrick, (D.) 77.
  Generation of power. By Eberle, (D.) 538.
  Influence of accurate measurements. By Haskins, 361.
  Lamp economy. By Lake, (D.) 225; Free supply. By Gibbings, (D.) 392, 458, 509, 539.
  Operation costs, Phil., (D. R.) 308; By Hunter, (D.) 537.
  Rating of economy, 697.
  Small plants. By Reeve, 672.
  Edison Company, Brooklyn, 701*.
  Efficiency of entire plant. By White-Fraser, (D.) 309.
  English, Modern, 668*.
  Feeder system and switch gear, (D.) 562.
  Financial success. By Armstrong, (D.) 16.
  Flushing, L. I., 659*, (D. R.) 736.
  Frankford, Report, (D. R.) 252.
  Frankfort, Alternating-current, (D. R.) 393.
  Garbage as fuel, (D.) 308; Shoreditch, (D.) 76, 538; By Perry, (D.) 735.
  Gas engines. By Koerting, (D.) 457.
  Cambuslang, Scotland, (D. R.) 677.
  Failures, (D.) 308.
  Zurich, (D. R.) 101.
  Germany, Statistics, (D.) 101. By Lux, (D.) 509, 562, 645.
  Glasgow, Centralization of supply (D.) 676; By Wright, (D.) 459.
  Gloucester, (D. R.) 337.
  Great Britain.
  History. By Hammond, (D.) 707.
  Multiphase machinery little used, (D.) 707.
  Hammersmith Vestry Electric Lighting Works, Eng., 668*, (D.) 459.
  Hartford, Fire, 324.
  High-voltage plants. By Shepardson, 120.
  London report, (D.) 136.
  Oxford system, (D.) 363.
  Kansas City. By Morgan, (D.) 337.
  Lamp economy. By Lake, (D.) 225.
  Free supply of lamps. By Gibbings, (D.) 392, 458, 509, 539.
  Leicester sub-stations. By Steinmetz, (D. R.) 459.
  Load lines. By Abbott, (D.) 363.
  Loads, Day. By Kammerer, (D.) 16.
  London.
  Capital outlay, receipts and expenditures, (D.) 707, 563.
  Meter department. By Hordern, (D. R.) 337.
  Statistics, 1896, (D.) 16, 136.
  Manchester, Municipal ownership, (D. R.) 422, 594.
  Mannheim, Three-phase system, (D.) 706.
  Massena, (D.) 196.
  Meter department, London. By Hordern, (D. R.) 337.
  Metropolitan Co., New York, (D. R.) 458.
  Moonlight schedule for 1898, 658.
  Municipal. (See Municipal ownership.)
  Niagara Falls. (See Niagara.)
  Oxford, High-tension, direct-current system, (D.) 363.
  Paderno, Italy, (D.) 767.
  Paris, Operation data, (D. R.) 135.
  Paterson, N. J., Coal bin accident, 209, 212*.
  Philadelphia.
  Cost of operation, (D. R.) 308.
  Traction Co. By Gunton and Lomas, (D. R.) 507.
  Pittsburg, Allegheny County Light Co. By Thomas, 612*.
  Rand, in the Transvaal, (D. R.) 707.
  Reading, Eng., (D. R.) 594.
  Rheinfelden. By Laffargue, (D.) 336.
  Richmond Railway & Electric Co., 662*.
  Rochester. By Muldaur, (D. R.) 422.
  Shoreditch, 2, (D.) 76, 538, (D. R.) 136; By Perry, (D.) 735.
  Small plants. By Reeve, 672.
  Strassburg, Three-phase, (D) 280.
  Switzerland, Wanau. By Petavel, (D.) 75.
  Systems, Choice of best, (D.) 706.
  Tendency of development, 673, 703, 759.
  Terre Haute, Ind. By Ray, (D.) 198.
  Torquay, Generating sets, 729*.
  Trollhaettan, Sweden, (D.) 279.
  220-volt three-wire systems. By Willcox, 388.
  225-volt system, Canton, Pa. By Perkins, 42*.
  Vs. isolated plants, 657; By Moses, (D.) 198, 309.
  Vienna, Annual report, (D. R.) 393, 736.
  Voltage control, (D.) 767.
  Water-driven plants. By Murphy, (D.) 16.
  Windsor, Eng., Direct-current accumulator station, (D. R.) 197.
  Zurich, (D. R.) 539; By Cahn, (D.) 458.
  Gas power, (D. R.) 101.
  Report, 1896, (D. R.) 459.
  (See also Isolated plants; Railways, Electric; Transmission plants.)
Centrifuge, Heiman electrical, 19*.
Chambly Mfg. Co.'s transmission plant, 407*.
Charging for electrical energy. By Pink, (D.) 46.
  Different systems discussed. By Brown and Routin, (D.) 647.
  Flat rates, (D.) 645; By Schuchardt, (D.) 594.
  France, (D. R.) 102.
  Hopkinson methods. By Claude, (D.) 707.
  Inductive power load, (D.) 280.
  Meters vs. flat rates. By Schuchardt, (D.) 594.
  Various methods. By Pellissier, (D.) 422.
  Wright system. By Claude, (D.) 707.
Chemical analysis by.
  Electrolysis. By Arth, (D.) 137.
  Telephone. By Erdmann, (D.) 365.

Chemistry, applications of electro-chemistry to organic. By Elbs, (D.) 47, 254.
Cherry meters, 339*.
Chicago University. By Starr, (D. R.) 463.
Chlorate of potash, Manufacture of. By Kershaw, (D.) 47.
Chlorates.
Electrolytic. By Becker, (D. R.) 510.
Hurter process, (D.) 460.
Chloride of potash, Manufacture at Niagara Falls. By Overbury, (D.) 78.
Chlorine from chloride of calcium, (D.) 646.
Chromium.
Alloys, (D.) 253.
Production. By Aschermann, (D. R.) 679.
Churning by trolley, 278.
Circuit breakers. By Stine, (D.) 280.
Automatic, for high-tension circuits, (D.) 16, (D. R.) 102.
Cox, (D.) 423.
Development of. By Scott, (D. R.) 768.
Induction coil. By Margot, (D.) 138.
Magnetic. By Cutler, (D.) 198.
Motor protection. By Sachs, 354, (D.) 677.
Testing of automatic. By Clark and MacMullen, (D.) 102, 135.
Vs. fuses. By Bevan, (D.) 280; Cutler, Henshaw and Downes, (D.) 509, 736; Harrington and Sachs, (D.) 677, 736.
Circuits.
Alternating-current, Capacity in. By Houston and Kennelly, 63, 300.
Artificial lines, Calculation of currents. By Vaschy, (D.) 48.
Diagrams of instantaneous voltage. By Allen, (D.) 281.
Economy in lamp circuits. By Keeley, (D.) 16.
Model. By Garvasso, (D.) 768.
Oscillations in mutually inductive circuits. By Houston and Kennelly, 35.
Physiological action at closing. By Du Bois, (D.) 227.
Cities of the future. By Mullin, (D.) 593.
Clausius Mossotti formula. By Millikan, (D. R.) 103.
Climax damper regulator, 566*.
Climbers for iron poles. By Glassford, (D. R.) 18.
Clip, Luscomb, 468*.
Clocks, Electric.
Signaling. By Elsaesser, (D.) 596.
Tower clock, (D.) 139.
Coal bin failure, Paterson, N. J., 209, 212*, (D. R.) 422.
Coal-cutting machines, Brazil, Ind., 95*.
Coal mining. (See Mining.)
Coherers. By Calzecchi, (D.) 646.
Carbon. By Brown, (D.) 736.
Carbon powder, Sensitiveness. By Swinton, (D.) 707.
History of. By Lodge, (D.) 677.
Lightning effect. By Englisch, (D.) 736.
Origin of, (D. R.) 253.
Practical application of. By Brown, (D.) 677.
Coils. Heating magnet coils. By Girault, (D.) 279.
(See also Induction coils.)
Colloids, Migration of. By Coehn, (D.) 254.
Columbus, Ga., Electrical equipment. By Boileau, 275*.
Columbus pipe-threading machine, 566*.
Comets, Tail of, Phenomena in vacuum tubes, (D.) 618.
Commercial Cable Building, electric plant, 551*.
Commercial Electric Co., Motor, 397.*
Commutators.
Constructing. By Fells, (D.) 593.
Insulation of. By Baxter, (D.) 135.
Repairing. By Sharpe, (D. R.) 15.
Segments. By Corson, (D.) 735.
Table for divisions of commutators, (D.) 363.
Compass variation affected by geological structures. By Lyman, (D. R.) 460.
Complex quantities and vectors. By Domerque, (D. R.) 226.
Compressed air traction, Tests in New York, 210 (D.) 458.
Compressional electric or magnetic waves. By Heaviside, (D. R.) 677.
Condensers.
Copper cylinders filled with paraffine. By Kleiner, (D.) 366.
Discharge of. By Garbasso, (D.) 459.
Electrolytic action and insulation resistance. By Guthe, (D.) 367.
Exhaust steam surface, 284*.
Heating of. By Houllevigue, (D.) 77.
Oscillating discharge of. By Sallquist, (D. R.) 17.
Conducting shell, Spherical. By Whitehead, (D.) 281.
Conductivities of solutions of water in formic acid. By Novak, (D.) 103; Whetham, (D.) 103.
Conductivity, Magnetic and electrolytic. By Milani, (D.) 678; Fritsch, (D. R.) 17.
Conductivity measurements with a direct-reading conductivity bridge. By Willyoung and Harth, 579*; Sayen, 641.
Conductors.
Aluminum, Use of. By Kershaw, (D.) 309.
Calculating capacities. By Potier, (D. R.) 364.
Calculating circular mils. By Parnell, (D.) 77.
Heating of, by alternating currents. By Guye, (D. R.) 78.
Liquid air for reducing resistance. By Fleming, (D.) 364.
Molecular theory. By Silberstein, (D.) 540.
Resistance to variable current. By Brylinsky, (D.) 78, 253.
Safe-carrying capacity. By Sewall, (D.) 707, 768.
(See also Wires.)
Conduits.
Cummings, under pavement. By Dunlap, (D.) 46.
Insulated, (D.) 136, 393.
Plain pipes vs. lined pipe, (D.) 46; By Zingler, (D.) 16; Venable, (D. R.) 422.
St. Louis Construction. By Cosby, 217*, 242*, 267.
Testing. By Jehnke, (D.) 102.
(See also Wiring.)
Congressional Library, Illumination of rotunda. By Hutchinson, (D.) 593.
Constable Building, New York City, engine room, 139*.
Contact and distant action. By Drude, (D.) 422.
Controllers, Railway.
Economy in handling. By Cravath, (D.) 252, 308, 508; Knox, (D.) 308; Monroe, (D.) 197; Short and Dodd, (D.) 197.
New form. By Blondel, (D.) 617.
Walker Co., 629*, (D. R.) 767.
Converters. (See Transformers.)
Cooking apparatus, Electrical, Economy and utility of. By Fox, (D.) 199; Jackson, 113, 122.
Copper.
Deposit, Effect of time on the nature of. By Ullmann, (D.) 47.
Electrolysis of copper sulphate. By Foerster and Seidel, (D.) 17.
Electrolytic refining, in the United States. By Ulke, (D.) 366.
Exports of, 39.
Hardened, Farmer's experiments. By Borden, (D.) 227.
Production in United States, 350.
Residues, in copper refineries. By Keller, (D.) 595.
Corliss electric engine stop, 428*.
Cosmo telephones, 397*.
Cranes, Electric. By Ravenshaw., (D.) 705, 735.
Hamburg dock, (D.) 735.
Steamer equipment, (D.) 224.
Crystals, Electric properties of. By Beckenkamp, (D. R.) 226.
Current curve tracer. By Abraham, (D.) 138, 170; Rosa, 631*, 670*.
Current recorder on railways, 710*.
Currents, Electric.
Electrolytes, Currents passing through. By Danneel, (D.) 679.
Intermittent, of high frequency. By Rocher, (D.) 364.
Photo-electric. By Elster and Geitel, (D. R.) 226.
Physiological and therapeutical action of high-frequency, (D. R.) 310.
Polyphase, Apparatus for illustrating. By Wurstemberger, (D.) 78.
Therapeutic local action. By Oudin, (D.) 104.
Therapeutical application of undulatory. By Apostoli, (D.) 283; Meylan, (D.) 48.
(See also Alternating currents.)
Curve tracer. By Rosa, 631*, 670*; Abraham, (D.) 138, 170.
Curves.
Alternating-current. By Armagnat, (D.) 338, 394; Eichberg, (D.) 394.
Determining. By Kubler, (D.) 596.
Recording. By Duddell, (D.) 366.
Measuring. By Braun, (D. R.) 138.
Registering alternating-current curves. By Abraham, (D.) 138, 170; Rosa, 631*, 670*.
Cut-outs.
Pass & Seymour, 650*.
Perkins "P. T.," 341*.
Cutaneous evaporation, Action of X-rays on. By Lecercle, (D.) 678.
Cutler-Hammer electric elevator controllers, 465*.
Cyrus W. Field collection at National Museum, 116.

D

Dam, Richelieu, Quebec, 407*.
Damper regulator, Climax, 566*.
Damping of rotating insulators. By Duane and Stewart, (D.) 198.
Dark light. By Le Bon, (D. R.) 281.
Daylight, Brightness of. By Vogel, (D.) 282.
Dayton Gas Engine & Mfg. Co.
Gas engines, 512*.
Turbines, 514*.
Death, Electric, Painlessness of. By Hedley, (D.) 255.
Delaney, P. B., Biographical notice, (D. R.) 648.
Depolarization, Rates of. By Klein, (D.) 563.
Detector, Carbon, for Hertz waves. By Jervis-Smith, (D.) 677.
Diagram accounts for engineering work. By Jameson, (D.) 680, 709.
Diamagnetic and feebly magnetic substances. By Lombardi, (D.) 226.
Diamonds.
In residues of calcium carbide, (D.) 138.
Reproduction of. By Majorana, (D.) 738.
Diehl arc lamps, 680*.
Dielectric constants. By Starke, (D.) 281.
Low temperatures. By Dewar and Fleming, (D.) 364; Abegg, (D.) 563.
Measuring. By Drude, (D.) 226, 737.
Dielectric strength of oils. By Northrup and Pierce, 549, 559; Steinmetz, 609.
Dielectrics.
Capacity and residual charge of. By Hopkinson and Wilson, (D. R.) 46.
Conversion of electric energy in. By Threlfall, (D.) 170, 460.
Inductive capacity. By Ferry, (D.) 645.
Secondary waves in. By Righi, (D.) 540.
Dingley tariff bill, 89, 91.
Discharge of electrified bodies by X-rays. By Child, (D.) 619.
Discharge potentials. By Swyngedauw, (D.) 393.
Discharges, Electric. By Hoffman, (D.) 707; Wesendock, (D. R.) 17.
In.
Air. By Trowbridge, (D.) 309.
Metallic cage. By Ebert and Wiedemann, (D.) 459.
Rarefied gases. By Lamotte, (D. R.) 737.
Oscillatory, of large accumulator. By Trowbridge, (D.) 310.
Produced by a spark, Herz exciter. By Swyngedauw, (D. R.) 77.
Static and dynamic explosive potentials. By Swyngedauw, (D.) 16.
Vacuum, Influence of magnetization. By Melani, (D.) 422.
Dodge dynamo pulley, 465*.
Dolbear, Prof., Experience with a ghost, 223.
Drainage plant at Memel delta. By Silberstein, (D. R.) 507.
Drawbridges, Electric operation.
Duluth. By Woodbridge, 7*.
Toronto, (D.) 308.
Dredge, Electric operation, New Zealand, (D.) 363.
Drills, Electric.
Automatic attachment, 49*.
Bladray mining drill, (D.) 645.
Rosedale iron mines. By Hay, (D.) 308.
Rotary, (D.) 167.
Dynamo factory and power station, A primitive, 578.
Dynamo pulley, Dodge, 465*.
Dynamos. By Mordey, (D. R.) 363.
Alternating-current.
Calculation of. By Fischer-Hinnen, (D.) 537.
Constructing small dynamo. By Hopkins, (D.) 336.
Determining the E. M. F. By Knudson, (D. R.) 766.
Iron losses. By Behn-Eschenburg, (D. R.) 336.
Laboratory work. By Carhart, (D.) 307.
Large three-phase, 429.
Long transmissions. By Raymond, (D.) 279.
Parallel running. By Ewing, (D. R.) 593.
Universal. By Carhart, (D. R.) 675.
Westinghouse engine type, 681*.
Belt-type. By Wheeler, 424*.
Bids, Munich central station, (D.) 507.
Biphase alternators in preference. By Van der Wallen and Mavroidis, (D.) 102.
Calculation of. By Arnold, (D. R.) 705.
Care of. By Domville, (D.) 644.
Characteristics, Interpretation of. By Hotchkiss, (D.) 101; Stine, (D.) 75.
Connections for simultaneous operation, (D. R.) 675.
Construction of. By Guilbert, (D.) 167.
Design, New principles in, 200*.
Dettmar, Theory of. By Feer, (D.) 101.
Development of twenty-five years. By Eason, (D. R.) 705.
Direct-connected.
Bullock multipolar, 684*.
Westinghouse gas engine, 105*.
Vs. belt-driven, (D.) 705.
Direct-current, Bernard Co., 427*.
Early manufacture of, 578.
Efficiency, Formulas for calculating. By Weiner, (D.) 75.
Excitation at full load, Predetermination of. By Dick, (D.) 15.
1500-kw, Allegheny County Light Co. By Thomas, 612*.
French multipolar, (D.) 391.
Fynn alternator direct-connected, 729* (D. R.) 336.
Governing alternators in parallel. By Lyndon, (D.) 135.
Improvements. By Guilbert, (D. R.) 507, 675.
Installation of large machines. By Hanchett, 665*.
Interaction between armature and field. By Norris, (D. R.) 101.
Internal poles, 427*.
Magnet windings, Determining number of. By Camichel, (D.) 135.
Magnetic materials for, 386.
Mordey winding, (D.) 45; By Sayers, (D.) 15.
Multi-circuit arc, 313*.
Polarity reversals. By Comstock, (D.) 279; Wolcott, (D.) 507.
Regulation of the exciting current. By Gibson, (D.) 766.
Roth multipolar, 311*.
Rothert, Theory of. By Feer, (D.) 101.
Rushmore multi-circuit, (D.) 101; By Kennedy, (D.) 252.
Series winding, Determining. By Fry, (D.) 503; Fleischmann, (D.) 593; Shueler, (D.) 705.
Slot-wound, (D. R.) 15.
Slow-speed, direct-connected, (D.) 736.
Smith, (D. R.) 507.
Smooth body, General Electric, 710*.
Standard specifications for, 299.
Students' machine, 740*.
Synchronism, Determining by telephone. By Meyer, (D.) 362.
Testing, (D.) 279; By Smith, (D. R.) 675.
Hopkinson method, (D. R.) 738.
Stray power method, (D. R.) 511.
Thompson-Ryan. By Thompson, (D.) 196.
Three-phase, Armature reaction. By Braun, (D.) 75.
Various designs. By Guilbert, (D.) 391.

E

Earth as a great magnet. By Fleming, (D. R.) 253.
Earth currents, Electric. By Cottrell, (D.) 595, 737.

Earth's magnetic field, Rapid variations. By Kohlrausch, (D. R.) 103.
Earth's magnetic poles, Movements of. By Weyer, (D.) 337.
Earth's magnetism, Constants of. By Eschenhagen, (D. R.) 393.
Economizers, Proper construction and uses of. By Brinckerhoff, 639.
Edison Illuminating Companies, Convention, 329, 361.
Educational ideal, Evolution of. By Paulsen, (D. R.) 80.
Election returns in New York, Electrical projection of, 575*.
Electric absorption and chemical constitution, Relations between. By Drude, (D. R.) 136.
Electric carriages. (See Motor vehicles.)
Electric currents. (See Currents.)
Electric curve tracer. By Rosa, 631*, 670*; Abraham, (D.) 138, 170.
Electric curves. (See Curves.)
Electric distribution on the surface of a ring. By Boulgakoff, (D. R.) 253.
Electric endosmose. By Villemontee, (D.) 540.
Electric journals published in the world, (D.) 462.
Electric lamps. (See Arc lamps; Incandescent lamps.)
Electric pressure. By Mebins, (D.) 226.
Electric waves. By Mazzotto, (D.) 540; Merritt, (D.) 103.
  Analysis, Use of interferometer. By Hull, (D.) 364.
  Attenuation and reflection. By Barton, (D.) 281.
  Coefficient of refraction. By Lampa, (D.) 337.
  Compressional. By Heaviside, (D. R.) 677.
  Effect of exciter on. By Apt, (D. R.) 540.
  Hertz waves and metallic enclosures. By Lodge, (D.) 646.
  Interferometer in study of. By Hull, (D. R.) 619.
  Propagation of waves along connected systems of similar bodies. By Rayleigh, (D.) 281, (D. R.) 509.
  Researches. By Rayleigh, (D.) 103.
Electrical catechism, (D. R.) 199.
Electrical convexion of certain dissolved substances. By Picton and Linden, (D.) 199, 393.
Electrical engineering in Europe, American. By Porter, (D.) 648.
Electrical engineers.
  Army corps, 30, 44.
  Germany, Union of, (D.) 79.
  Training of, (D.) 104.
Electrical exhibitions.
  New York, 1898, 739*.
  Sydney, New South Wales, 527*.
Electrical industries in Germany, (D.) 339.
Electrical insulation, A study of. By Phisterer, 554, 583.
Electrical machinery, Care of. By Baxter, (D.) 75, 196, (D. R.) 336, 618.
Electrical nomenclature, Need of precise, 694, 734.
Electrical research at low temperature. By Dewar and Fleming, (D.) 364.
Electricity.
  Atmospheric. By Cancani, (D. R.) 78; Brillouin, (D.) 364; Dunn, (D.) 337.
  Chronological history. By Mottelay, (D.) 283.
  Course of reading. By Perrine, (D.) 283.
  Development in England and France. By McGhie, (D. R.) 311.
  Economy and distribution of electrical energy. By Ferguson, (D.) 363.
  Mechanism of electrical phenomena. By Weyde, (D.) 393.
  Muscular. By Wright, (D. R.) 541, 738.
  Physical theory of electricity and magnetism. By Hall, 10.
  Practical lessons, (D. R.) 199.
  Principles of. By Tyler, (D.) 78, 510.
  Production from.
    Carbon, (D.) 393, 460; By Fodor, (D. R.) 365; Hellweg, Jr., 96*.
    Coal and air. By Short, (D.) 769.
    Heat. By Coxe, (D.) 680; Deprez, (D.) 565, (D. R.) 680.
  Residual, Theories of. By Houllevigue, (D.) 77.
Electrified ellipsoid, Steady motion of. By Searle, (D. R.) 77.
Electro-capillary phenomena. By Harris, (D.) 136.
Electro-chemical and electro-metallurgical industries in Europe. By Kershaw, (D.) 227, 336, 423, 619.
Electro-Chemical Society, German, Meeting, (D.) 137.
Electro-chemical theories. By Mewes, (D.) 365, 708.
Electro-chemistry.
  Progress made. By Andreoli, (D. R.) 708; Blount, (D.) 679.
  Relation to organic chemistry. By Elbs, (D. R.) 254.
Electrodes.
  Carbon, New. By Hertel, (D.) 708.
  Depolarization of platinum and mercury. By Meyer and Klein, (D.) 137.
  High-frequency currents. By Oudin, (D.) 462.
Electrolier for night repairs on trolley line. By Hopkins, (D.) 363.
Electrolysis.
  Alkaline chlorides. By Hulin, (D.) 136.
  Alternating-current, Laws of. By Melagoli, (D.) 679.
  Chemical analysis by. By Arth, (D.) 137.
  Concentration and. By Kohlrausch, (D.) 595.
  Dissociation theory. By Nernst, (D.) 679.
  Gases. By Wiedemann and Schmidt, (D.) 282.
  Mechanical theory of. By Weyde, (D.) 679.
  Quantitative electrolysis of metals. By Wolman, (D.) 137.
Electrolysis. (Continued.)
  Russian industry. By Rostin, (D.) 365.
  Salts and bases. By Lovanitch and Jovitschitch, (D.) 47.
  Sugar factories. By Schollfmeyer, (D.) 137.
  Theory of. By Nernst, (D.) 540.
  Water. By Nernst, (D.) 310.
  Water pipes. By Knox, (D.) 337.
    Chicago, (D.) 337.
    Prevention by Brown, (D.) 538.
Electrolytes.
  Conductivity of, (D.) 47.
  Mutual diffusion of. By Behn, (D.) 460.
Electrolytic dissociation, Theory of. By Carrara, (D.) 540.
Electrolyzer, Rhodin system, (D.) 595; By Kershaw, (D.) 679.
Electromagnetic shielding. By Russell, (D.) 678.
Electromagnetic waves. By Righi, (D.) 253, 422.
Electromagnets.
  Pull of. By Reithoffer, (D.) 678.
  Solenoid. By Warren, (D.) 563.
Electro-metallurgy, Development, in United States. By Ulke, (D. R.) 103.
Electrometers.
  Capillary. By Behn, (D.) 310.
  Quadrant. By Dolezalek, (D.) 338.
Electrophone in London theatres. By Wright, (D.) 367.
Electro-plating on wood, Fowler's secret, 193; By Haskins, 355.
Electrostatic and electromagnetic units. By Hurmuzescu, (D.) 79.
  Ratio between. By Maltby, (D.) 199.
Electro-synthesis. By Mixter, (D.) 78.
Electro-therapeutics, Progress in twenty-five years. By Hedley, (D.) 709.
Electrotherm, Improved, 620*.
Electro-zincing. By Cowper-Coles, (D.) 737.
Elevated railways. (See Railways, Elevated.)
Elevator travel indicator, Electric, 285*.
Elevators, Electric. By Ravenshaw, (D.) 705, 735.
  Calling signals, N. Y. Telephone Building, 270*.
  Central London Ry., 81.
  Controllers, Cutler-Hammer, 465*.
  Discussion of problems. By Woodbridge, 165.
  Grain. By Dunlop, (D.) 224.
  Inclined plane, Paris store, (D.) 46.
  Standards of practice. By Moses, (D.) 736.
Employees.
  Efficiency, How to increase, 330.
  Railway, Discipline of. By Davis, 489.
Energy, Properties of Different forms. By Vaschy, (D. R.) 510.
Engine cylinders, Relative size of, 702.
Engine governors.
  New, 228.
  Thunderbolt system, (D. R.) 593.
  Responsibility of, 750.
Engine stop, Corliss electric, 428*.
Engines.
  Allfree automatic, 80*, 174*.
  Ball single-cylinder, 512*.
  Economic automatic, 80*.
  Gasoline, New Era, 173*.
  Power station requirements. By Emery, (D.) 508, 767.
  Rigid or elastic foundations. By Swinburne, (D. R.) 101.
  Selection of, for power plant. By Wickens, (D. R.) 16.
  Vertical cross-compound, 369*.
Engraving, Electric. By Langbein, (D.) 393.
Equipotential surfaces. By Pomey, (D. R.) 563.
Ether, Motion of, in an electromagnetic field. By Henderson and Henry, (D.) 103; Lorentz, (D. R.) 768.
Evans, Sir John, 119*.
Evaporation water cooler, 714*.
Excelsior feed water heater, 512*.
Exhaust steam, Utilization of. By Thayer, 130.
Exhaust steam surface condenser, 284*.
Eyes, Effect of light on, (D.) 75.

F

Factories and shops, Electric power. By Bell, (D.) 45, 196; Chirehugh, (D. R.) 16; Scott, (D.) 45; Sheldon, 39.
  Farrel Foundry & Machine Co., 106*.
  Flour mills of California, 621*.
  Garvin Machine Co., 139*.
  Linotype Company, Motors, (D.) 645.
  Lond. & North. Ry. shops, (D.) 457.
  Motors, 234*.
  Printing and binding machinery. By Bishop, 406, 419*, 419.
  Vs. shafting. By Benjamin, (D.) 224.
  Vickers' Works at Sheffield, (D.) 766.
Fans, Electric, Ventilating. By Walker, (D.) 224, 644.
Faraday, Michael, Biography, (D. R.) 199.
Farmer, Miss Sarah J., 128*.
Farmer, Moses Gerrish, 128*.
Farrel Foundry & Machine Co., electric power, 106*.
Faults, Localization, in underground mains. By Quin, (D.) 168, 197.
Feed water heater, Excelsior, 512*.
Feed water heater and purifier, Pittsburg, 369*.
Feeder system and switch gear, (D.) 562.
Ferraris, Galileo, Memorial to, 456.
Fields.
  Rotating magnetic. By Colard, (D.) 364, 459.
  Rotation in constant. By Boltzmann, (D. R.) 103.
Filaments, Lamp.
  Maxim's, (D.) 308.
  New material. By De Vita, (D.) 167.
Filter diaphragms, Hulin system, (D.) 461.
Fire department, N. Y., Rules, (D. R.) 459.
Fire extinguisher for central stations, 648.
Fires.
  Cable power house, Washington, D. C., 406, 417*.
  Nassau Ry Co., 302*.
Floating current motors, (D. R.) 457.
Flour mills of Cal., Electric power in, 621*.
Flume, Bakersfield power plant, 412*.
Flywheel accident, Tacoma St. Ry. Co., 65.
Flywheels for traction plants, (D.) 706; By Raworth, (D.) 767.
Fountains, Electric.
  Arc lamps, 229*.
  Prospect Park, Brooklyn, 219*.
  Willow Grove. By Renwell, (D.) 75.
Franklin's kite experiment. By McAdie, (D.) 460.
Frequency, Instrument for measuring. By Meyer, (D.) 461.
Fuller & Curtis ventilator, 311*.
Fumes, Electrical properties, By Kelvin and Maclean, (D.) 595.
Furnace, Open hearth, Charging. By Head, (D.) 45.
Furnaces, Electric. By Patten, (D. R.) 228, 283; Pfleger, (D.) 137.
  Acheson patent, (D.) 283.
  Calcium carbide, Italy, Regnoll system, (D.) 171.
  Frankfort furnace. By Liebmann, (D.) 137.
  Helbig system, (D.) 48.
  Laboratory, (D. R.) 48.
  Lelievre and Pictet forms, (D.) 255.
  Tubular. By Helbig, (D.) 339.
Fuse cut-out, New type. By Sonneberg, (D.) 198.
Fuse repair outfit, Chicago, 397*.
Fuse wire, Straight line relation for, 251.
Fuses.
  Blasting. By Van Deth, (D.) 730.
  Design of reliable. By Woodbridge, (D.) 198.
  Motor protection. By Sachs, 354.
  Service of. By Stine, (D.) 280.
  Test of. By Laporte, (D.) 169.
  Vs. circuit breakers. By Bevan, (D.) 280; Cutler, Henshaw and Downes, (D.) 509.

G

Galvanization of iron, Electrolytic, (D.) 337.
Galvanometer method of titration. By Salomon, (D.) 226.
Galvanometers.
  Ballistic, in theory and practice. By Crapper, (D.) 282, 423.
  Discussion. By Ayrton and Mather, (D.) 423.
  Independent of variable field. By Raps and Franke, (D.) 79.
Garbage as fuel for central stations, (D.) 76, 308, 538; By Perry, (D.) 735.
Garvin Machine Co., Electric power, 139*.
Gas engines.
  Central station work, (D.) 308; By Koerting, (D.) 457.
  Dayton, 512*.
  Direct-connected to dynamo, 105.
  Failure in lighting stations, (D.) 308.
  Foos, 468*.
  Raymond improved, 467*.
Gas lighter, Automatic, (D.) 283*.
Gas lighting, Klinger system, (D.) 709.
Gaseous pressures, Measuring small. By Brush, (D.) 564.
Gases.
  Electrolytic conductivity. By Wiedemann and Schmidt, (D.) 460.
  Luminescence of. By Sagnac, (D.) 393.
Gasoline engines, New Era, 173*.
Gasoline motors, Direct connection to dynamos, 150.
General Electric Co.
  Arc lamps, 542.
  Dynamo, Smooth body, 710*.
  Gear plant, 683*.
  Motors, 464*.
  New types of apparatus, 368.
  Supplementary report, 116.
  Transformer, Testing, 310*.
German Electro-Chemical Society, (D.) 103, 227, 310.
Ghost experience by Prof. Dolbear, 223.
Glass, Dielectric constant, Effect of tension on. By Corbino, (D. 169.
Glass covered electrolytically with metal, (D.) 619.
Glass for bearings and conduits. By Marcillac, (D.) 48.
Globe Electric Heating Co. broiler, 285*.
Gold extraction. By Andreoli, (D.) 169.
  Cassell process. By Andreoli, (D.) 170, 198, 254.
  Cyanide solutions. By Creasdale, (D.) 47; Ehrmann, (D.) 198.
    Cowper-Coles process, (D.) 137.
  Haycraft process. By Clark, (D. R.) 17.
Governing of dynamo-driving water wheels, 534*.
Governors, Engine.
  New, 228*.
  Thunderbolt system, (D. R.) 593.
Grain elevators, Electric power. By Dunlap, (D.) 224.
Griffin indicator for elevators, 285*.

H

Hanger, Incandescent lamp, 81*.
Hanger board, McDonald glass, 200*.
Harrington rail bond, 312*.
Hat manufacture, Use of electric heat, 115*.
Hawaii, Electricity in, 667.
Heat and cold regulator. By Richter, (D.) 541.
Heat energy of light, (D.) 167.
Heat waves, Electromagnetic properties. By Rubens and Nichols, (D. R.) 423, 460.
Heaters, Electric.
  Car heaters, (D. R.) 309.
  Efficiency. By Hering, 195.
  Test. By Stevens and Lanphear, (D.) 283.

Heating, Electric.
Cars. By Damon, (D.) 645.
Hat factory, 115*, (D.) 738.
Heating error in resistance coils. By Laws, (D.) 423.
Heiman electrical centrifuge, 19*.
Hertz wave detector, Carbon. By Jervis-Smith, (D.) 677.
Hoist, Weston triplex, 740*.
Hope 600-ampere switch, 463*.
Human body, Magnetic polarity of, (D.) 510.
Hydroxyl groups in Azobenzoli, Electro-chemical introduction of. By Heypern, (D. R.) 254.
Hysteresis.
Determining loss in straight iron strips. By Fleming, (D.) 18, 394.
Heat of. By Weihe, (D.) 226.
Iron with temperature, Experiments. By Pitcher, 250.
Measuring, in iron. By Gill, 272.
Viscous magnetic. By Klemencie, (D.) 459.

I

Ignition by the electric spark. By Kelvin, (D.) 227.
Impedance, Variable. By Petrovitch, (D.) 46.
Impedance in alternating-current circuits. By Houston and Kennelly, 8.
Impedances in parallel. By Houston and Kennelly, 194, 244.
Imperial slow-speed motor, 341*.
Incandescent lamp filaments.
Maxim's, (D.) 308.
New material. By De Vita, (D.) 167.
Incandescent lamp hanger, 81*.
Incandescent lamp sockets.
Bryant fusible, 105*.
Non-interchangeable, (D.) 252.
Various. By Gruenwald, (D. R.) 224.
Incandescent lamps.
Action of electric field on. By Hoffman, (D.) 16.
Candle-power, Standard, (D.) 167.
Decorative and miniature, 682*.
Edison & Swan, New, (D.) 705.
Fogs of London, (D.) 457.
Free supply. By Gibbings, (D.) 392, 458, 509, 539.
High efficiency. By Jackson, (D.) 705.
High voltage, Tests. By Shepardson, 120.
Improvements. By Richard, (D. R.) 644.
Life and candle-power of, 763.
Maxim. By Maxim, (D.) 675.
New filament. By De Vita, (D.) 167.
Niagara Falls, Low frequency of current, (D.) 735.
Orchestra lamp, 740*.
Production of, 648.
Quality, Importance of. By Willcox, 694, 698.
Spectrophotometry of. By Turnbull, 43.
Standardizing. By Smith, (D.) 421.
Street car, 713*.
Street fixture, Almon, 649*.
Surgical lamp. By Heckman, (D.) 593.
Temperature variations. By Janet, (D. R.) 457.
220-volt. By Shepardson, (D. R.) 593.
220- and 110-volt lamps. By Willcox, 388.
Waterproof bracket, 174*.
Waterproof receptacle, 171*.
Incandescent lighting.
Congressional Library. By Hutchinson, (D.) 593.
Progress of twenty-four years. By Swan, (D.) 705.
25 cycles per second, 506.
India rubber.
Serullas process, (D.) 769.
Substitutes for. By Terry, (D.) 227.
Testing, (D. R.) 709.
Indicators.
Elevator travel, 285*.
For broken wire, Schuckert, (D.) 363.
Wright, Description. By Boistel, (D. R.) 16.
Inductance.
Apparent by sound. By Pierard, (D.) 423.
Capacity and, (D.) 281, 510.
Lag and, (D.) 510.
Measurement with the secohmmeter. By Allen, (D.) 138.
Measuring coefficient of. By Fry, (D.) 461*.
Mutual. By Houston and Kennelly, 358, 532, 581.
Phenomena in alternating circuits. By Millas, (D.) 169.
Principle of. (D.) 679.
Induction.
Laws of, poetically expressed, 633.
Long distance, Experiments with currents of high frequency. By Northrup, Pierce and Reichmann, 732, 755*.
Mutual, between coils, 452.
Short soft-iron magnets. By Eurich, (D.) 226.
Induction coils. By Wydts and Rochefort, (D.) 737.
Apps, Improvements, (D.) 647.
Construction of. By Hanchett, 59*.
Electrical tension at poles. By Oberbeck, (D.) 563.
Interrupter for, (D.) 103.
Maximum voltage. By Oberbeck, (D.) 459.
Mercury interrupter. By Hofmeister, (D.) 738.
Primaries of, (D.) 680, 738.
Tesla induction. By Tesla, (D.) 366.
Theory of. By Walter, (D.) 594, 645.
Instruction in practical electricity. By Swoope, 351*.
Insulated pipe vs. plain pipe for wires, (D.) 46; By Zingler, (D.) 16; Venatle, (D. R.) 422.
Insulating liquids, Viscosity of, in electric field. By Quinecke, (D.) 618.
Insulation, Electrical, A study of. By Phisterer, 554, 583, 610.
Insulation and resistance of street railway lines, Testing methods. By Porter, 61*.
Insulators.
High-voltage lines. By Sears, (D.) 539; Shoch, (D.) 539; Van Norden, (D.) 539.
Lithin, (D.) 769.
Locke high-voltage, 429*.
Porcelain, for transmission lines. By Martin, (D.) 768.
Replacing, on 10,000-volt live circuit. By Jackson, (D.) 618.
Testing porcelain glass insulators. By Hopkins, (D.) 680.
Insurance companies' rules, concerning installations, (D. R.) 198.
International Association Fire and Police Telegraph Superintendents, 155.
Interrupters. (See Circuit breakers.)
Iodoform, Electrolytic production. By Elbs and Herz, (D.) 365.
Ionization. By MacGregor, (D. R.) 227.
Determination of state of. By MacGregor, (D. R.) 540.
Physical properties and. By MacGregor, (D. R.) 17.
Power of solvents. By Novak, (D.) 103; Whetham, (D.) 103.
Solutions containing two electrolytes. By MacGregor, (D.) 365.
Ions.
Reactions of. By Kuester, (D.) 365.
Theory of ionic dissociation, (D.) 646.
Iron.
Deposition of, (D. R.) 137.
Electrolytic, Properties of. By Houllevigue, (D.) 47, 365.
Electrolytic galvanization of, (D.) 337.
Electrolytic separation of nickel and cobalt from iron. By Ducru, (D.) 460.
Hysteresis, Measuring, New method. By Gill, 272.
Magnetic properties. By Ebeling and Schmidt, (D. R.) 365.
Magnetic properties and electrical resistance dependent upon temperature. By Morris, (D. R.) 563.
Magnetic properties of iron from sand. By Wilson, (D.) 393.
Magnetic materials for dynamos, 386.
Magnetic test for iron. By Duane, (D. R.) 707.
Magnetization by small forces. By Holborn, (D.) 393.
Variation of magnetic qualities of iron with temperature. By Pitcher, 250, 250.
Iron and steel.
Ferro-magnetic properties. By Fleming, (D.) 594,646, 678.
Magnetization in weak fields, (D.) 47.
Iron losses.
Armatures of alternators, (D. R.) 336.
Transformers. By Burnie, (D.) 307.
Iron ore, Specular. By Westmann, (D.) 646.
Iron ore milling, Edison process, (D.) 565.
Iron oxides, Resistance of. By Abt, (D.) 646.
Iron smelting. By De Laval, (D.) 47.
Isolated plants.
Apartment house, N. Y. City, 229.
Astoria Hotel, 751*.
Blackpool Winter Garden, (D.) 46.
Bowling Green Building, 58, 66*.
Chicago department store, (D. R.) 563.
Columbus State Hospital. By Roberts, (D.) 77.
Commercial Cable Building, 551*
Compact small plant. By Lewis and Claflin, (D. R.) 707.
Constable Building, N. Y. City, 139*.
Insane Hospital, Wash., (D.) 225.
Milde & Co., France. By Laffargue, (D.) 459.
New York Clearing House, 74.
New York Life Building 31*.
New York State Industrial School, 529*.
Private residence, Chicago, (D. R.) 422.
St. Luke's Hospital, 327*.
Sandycroft Foundry, (D.) 16.
Sterling Building, N. Y. City, 256.
Tall buildings. By Pattison, (D.) 198.
Theatre, London, (D. R.) 280.
Three-phase, at Liverpool, (D.) 168.
Vs. the central station, 657; By Moses, (D.) 198, 309.
Walpole, Mass., Run by wind, (D.) 336.

J

Japan, American electrical apparatus in, 199.
Joints in telegraph and telephone wires. By Dobbs and North, (D.) 677.

K

Kelvin, Lord, 249*.
Visit at Schenectady, 382*.
Kent battery motor, 739*.
Keystone potential indicator, 566*.
Kite experiment, Franklin's. By McAdie, (D.) 460.

L

Labor problems, English vs. American methods, 90.
Laboratories.
Alternator, Universal. By Carhart, (D.) 307.
Diphase-current installations, (D.) 307, 537.
Electrical apparatus, 368*.
Munich High School, (D. R.) 254.
National Physical, Great Britain, (D.) 227.
Night courses in electricity. By Swoope, 351*.
Lachine Rapids, Montreal transmission plant, 377, 379*,
Lag, Alternating-current, (D.) 78.
Lamps.
Mining, Electric, Sussman. By Pierard, (D.) 421.
Phosphorescent, Pulvj system, (D.) 224.
(See also Arc lamps; Incandescent lamps.)
Lang, A. E., President, American Street Railway Association, 496.
Launches, Electric, (D. R.) 458, 594.
For Czar of Russia, (D.) 767.
Lead compounds, Electrolytic production, (D.) 646.
Leakage, Best means of preventing. By Walker, (D.) 16.
Lenard rays, Generation of. By Des Coudres, (D.) 459.
Light.
Action of magnetism on. By Kalischi, (D.) R.) 679.
Comparison of electric and petroleum, (D.) 307.
Dark. By Le Bon, (D. R.) 281.
Daylight, Brightness of. By Vogel, (D.) 282.
Heat energy of, (D.) 167.
Longitudinal. By Jaumann, (D.) 736.
Polarization, in magnetic field. By Egoroff and Georgiewsky, (D.) 169.
Propagated in a dielectric normal to the lines of force. By Brace, (D.) 509.
Relation to electricity. By Chant, (D.) 679.
Transmitted as cathode rays, (D.) 309.
Zeeman's discovery. By Cornu, (D.) 607, 768; Garbasso, (D.) 679; Lodge, (D.) 17, 423; Davies, (D.) 17; Koenig, (D.) 563; Van Autel, (D.) 17; Zeeman, (D.) 77, 768; Becquerel, (D. R.) 768.
Lighthouses.
English Coast, (D. R.) 766.
Penmarch, on French Coast, (D) 336, 644.
Lighting, Electric.
Artistic, in restaurant, (D. R.) 16.
Brooklyn Bridge equipment, 129*.
Chicago, Use of water works pumping plant, (D.) 457.
Compared with petroleum light, (D.) 307.
Decorative arches, Columbus, Ohio, (D. R.) 644.
Economy in circuits. By Keeley, (D.) 16.
London, Queen's Jubilee, (D. R.) 45.
Paris, Official report. By Bos, (D.) 766.
Portable plant, (D.) 225.
Railroad stations, (D. R.) 393.
Russian systems. By Lutoslawski, 30, 36.
Ship lights, (D.) 279*.
Stage use. By Bissing, 3; Baehr, (D.) 45.
Steamers, 384*; "Rotterdam," 305*.
Three-phase, Calculation of lines, 38*; By Cahen, (D.) 46.
Time switch, Automatic, 649.
Vacuum tube apparatus, Moore system, (D. R.) 167.
(See also Central stations.)
Lightning.
Atmospheric pressure, (D.) 648.
Globe, (D. R.) 367; By Bailly, (D. R.) 339.
Phenomenon. By Lockwood, (D.) 511.
Protection against, (D.) 766; By Atkinson, (D.) 311.
Lightning arrester, Universal non-arcing, 367*.
Lightning rods, (D.) 18, 282; By Hering, (D) 395.
Connections with gas and water mains, Berlin, (D. R.) 462.
Experiments. By Koch, (D.) 541; Messing, (D.) 395.
Lightships, Electric communication, Report of Royal Commission, (D.) 564.
Lines of force in Hertzian field. By Gutton, (D. R.) 677.
Liquid air, Possibilities in electrical work. By Thomson, 99; Fleming, 322, 325, (D.) 364.
Liquid coherers and mobile conductors. By Appleyard, (D. R.) 77.
Liquids.
Hall effect in. By Chiavassa, (D.) 540; Florio, (D.) 540.
Magnetization of. By Yaeger and Meyer, (D. R.) 365.
Specific heat, Determining. By Callender and Barns, (D.) 310.
Lithin, an insulating material, (D.) 769.
Locke high-voltage insulators, 429*.
Locomotives, Compressed air, Tests in New York, 210.
Locomotives, Electric.
Berlin railways, (D.) 337.
Farmer's, of 1847, 127*.
France, Western Ry., (D.) 392.
Heavy, for German railways, (D. R.) 645.
Heilmann, (D. R.) 337, 676, (D.) 645, 735.
Jungfrau railway, (D.) 308.
Mason City, Ia., 465*.
Patton motor car, 629, 640*.
Switching, Prussian State Ry., (D. R.) 645.
Vs. motor cars. By Baxter, Jr., 132.
Luscomb clip, 468*.

M

McCormick turbines, 428*.
McCulloch, Robert, Address, 493.
McDonald glass hanger board, 200*.
Madison Square Garden, Plan of, for electrical exhibition, 739*.
Magnesium chlorides, Electrolytic decomposition. By Beebe, (D.) 17.
Magnet coils, Heating of. By Girault, (D.) 279.
Magnet windings, Determining the number of. By Camichel, (D.) 135.
Magnetarium, (D.) 737.
Magnetic after-effect. By Klemencic, (D.) 619.
Magnetic concentration. By Wetherill, (D. R.) 171.
Magnetic field in tunnel armatures. By Baily, (D.) 537.

Magnetic materials for dynamos, 386.
Magnetic polarity of the human body, (D.) 510.
Magnetic testing apparatus, A new. By Treat and Esterline, 696*.
Magnetic units. By Brylinsky, (D.) 461, 647; Blondel, (D.) 647.
Magnetism.
  Course of reading. By Perrine, (D.) 283.
  Development of twenty-five years. By Jamieson, (D. R.) 707.
  Physical theory of electricity and magnetism. By Hall, 10.
  Terrestial, (D.) 198; By Eschenhagen, (D.) 281, 510.
  Gauss theory. By Berzold, (D.) 423.
Magnetization.
  Effect of blows and heat on. By Fromme, (D.) 253.
  Modifications produced by. By Hurmuzescu, (D. R.) 737.
  Oscillatory discharge. By Veillon, (D.) 459.
Magnetization in two dimensions. By Grau and Hiecke, (D.) 365.
Magnetization of iron and steel by small forces, (D.) 47; By Holborn, (D.) 393.
Magnetization of iron wires. By Brackett, (D.) 103.
Magnetization of liquids and their dependence on temperature. By Yaeger and Meyer. (D. R.) 365.
Magnetization of a ring partially wound. By Sauter, (D.) 459.
Magnetometer, Improved unifilar. By Wild, (D.) 79.
Magnets.
  Calculating traction effect. By Vogelsang, (D.) 337; Uatalis, (D.) 393.
  Induction in short soft-iron. By Eurich, (D.) 226.
  Permanent. By Chistoni and De Vecchi, (D.) 679.
  Limiting magnetism of. By Andreas, (D.) 309, 423.
  Soft steel for electromagnets. By Abt, (D.) 281.
  Wellman, for lifting steel plates, (D.) 281.
  Winding, by Varley duplex method, (D.) 507.
Mail boxes, Electric, in buildings, (D.) 648.
Mast arm, the "Perfected," 141*.
Mathieson Alkali Works, Electrical equipment. By Haskin, 637*.
Measurement of electric current.
  Alternating-current circuits. By McKissick, (D.) 79.
  Changing the fundamental units in the absolute systems. By Malagoli, (D.) 18, 338; Brylinski, (D.) 138; Gray, (D.) 708.
  Mirror and scale method. Doubling accuracy of. By Wadsworth, (D.) 104.
  Shopwork, with telephone and bridge, (D.) 170.
Measuring capacity with a balance. By Lang, (D.) 461.
Measuring frequency of oscillations. By Margaret Maltby, (D.) 619.
Measuring instruments. By Armagnat, (D. R.) 48, 104, 138, 254, 310; Raps, (D.) 199.
Measuring low resistances. By Santarelli, (D.) 461*.
Mercury compounds, Forming insoluble. By H. Bugarszky, (D. R.) 254.
Mercury films, Formation of. By Appleyard, (D. R.) 103, 422.
Mercury resistance, Pressure coefficient of. By Palmer, (D.) 78.
Metallurgy.
  Progress made. By Andreoli, (D. R.) 708.
  Russian industry. By Rostin, (D.) 365.
Metals.
  Electric resistance. By Liebenow, (D.) 678.
  Quantitative electrolysis. By Wolman, (D.) 137.
  Reduction from ores, (D.) 254. By Sinding-Larsen, (D.) 137.
  Separating, with electric meters. By Danneel, (D.) 460.
  Thermo-electric properties of liquid. By Burnie, (D. R.) 77.
Meter department in London station. By Hordern, (D. R.) 337.
Meters, Electric.
  Alternating-current, (D.) 337.
  Arc light, 199*.
  Brillie system, (D), 708.
  Description of different meters. By Schuchardt, 131.
  Discussion. By Brown and Routin, (D) 647; Wilmshurst, (D.) 104.
  Discussion from station standpoint. By Haskins, 114, 121.
  Electro-therapeutic work, (D.) 647.
  Ferranti. By Ricks, 303*.
  Hookham, (D. R.) 79.
  New types, 621*.
  Penny-in-the-Slot, London, 151.
  Perry. By Ricks, 356.
  Phase-meter, Theory and application of. By Teichmueller, (D.) 394, 510, 596.
  Prepayment. By Couzens, (D.) 135, 225.
  Schuckert. By Ricks, 303*.
  Tangent, phase-meter. By Arno, (D.) 394.
  Testing, Original method. By Schuchardt and Jones, (D.) 680.
  Tests on variation of constants with temperature and current. By Ricks, 246*, 303*, 356*; Haskins, 442.
  Vs. flat rates. By Schuchardt, (D.) 594.
  Wagner Electric Mfg. Co., 395*.
Micanite, Insulation of, (D.) 393.
Microbes in the body, Removing, (D.) 596.
Microphone transmitter, Snyder, 465*.
Migration of colloids. By Coehn, (D.) 254.
Milliammeters for alternating current circuits, 649.
Mineral industry for 1896, 121.
Mining, Electric power, (D.) 45.
  Brazil, Ind., coal mine, Tests, 90, 93*.
  Drills, Rotary, (D.) 167.
  Penn. By Greeley, (D.) 766.
  Pump, Electric, France, (D.) 45.
Mining lamp, Sussman. By Pierard, (D.) 421.
Moonlight schedule for 1898, 658.
Motor starter, Non-magnetic automatic, 567*.
Motor vehicles, 266; By Hospitalier, (D. R.) 336, 363.
  Accumulators on, (D.) 617.
  Berlin omnibus company, (D.) 135.
  Bersey cab, (D.) 280.
  Brussels, (D.) 225.
  Comparisons, (D.) 167.
  Construction of. By Claude, (D.) 562.
  Delivery wagons, 339*.
  Elieson system, London, (D.) 507, 676.
  French, (D.) 508.
  Future possibilities. By Woods, (D. R.) 736.
  Gasoline motors most successful, (D.) 76.
  German, Tests, (D.) 538.
  History. By Hospitalier, (D.) 101; Sachs, (D). 309, 458.
  Jeantaud, in 1895. By Fitz-Gerald, (D.) 421.
  London cab service, (D.) 308.
  Morris & Salom brougham, (D.) 225*.
  N. Y. City cab service, 182, 183*, 213*; by Fitz Gerald, (D.) 392; Dolnar, (D.) 76.
  Paris, Regular service, (D.) 101.
  Power required for driving, (D. R.) 363.
  Radius of action of. By Maxim, (D.) 736.
  Rae carriage, (D.) 676.
  Review of subject. By Coutades, (D. R.) 336.
  Riker carriage, 273*.
  Steam and oil vehicles. By Beaumont (D. R.) 309.
  (See also Trolley carriage.)
Motors, Electric.
  Ajax battery, 770*.
  Alternating current.
    Large starting torque. By Heyland, (D.) 391.
    Variable speed. By Geist, (D.) 391.
  Battery, Kent, 739*.
  Belt-type. By Wheeler, 424*.
  Berlin, Statistics, (D.) 135.
  Central London Ry., 596.
  Commercial Electric Co., 397*.
  Design for small motor. By Poole, (D.) 279.
  Direct-connected for
    Machine driving, 294.
    Printing press, 450*.
  Factory, Card Electric Co., 284*.
  Floating, for streams, (D.) 252.
  Fynn, Tests of, (D.) 167, 644.
  Induction,
    Large, (D.) 421.
    Tesla, 400 H-P., (D.) 307.
  Kent, with drum armature, 649*.
  One-quarter-HP. By Poole, D. R.) 75.
  Open ironclad, C. & C., 712.*
  Paragon, 368*.
  Printing press, Tests. By Bishop, 449*.
  Railway. By Hanchett, (D.) 76; (D. R.) 197; 309, 767.
    Chicago elevated. By Gerry, Jr., 152.
    Design of. By Wiener, (D.) 508.
    Efficiency tests. By Porter, (D. R.) 538.
    General electric. 49*, 464*.
    Polyphase, 322, 722.
    Position of motors. By Grove, (D.) 392.
    Shunt motors. By Bauch, (D.) 618; Egger, (D.) 76.
    Specifications for, Belgium, (D.) 224.
  Running three-phase from single-phase circuits, (D.) 224.
  Shunt, Comparison with series. By Luxenberg, (D. R.) 336.
  Slippage, Measurement of. By Schueler, (D.) 675.
  Slow speed, Imperial, 341*.
  Small, Lecoq, (D.) 307.
  Starting of alternating current single-phase induction motors, 700.
  Starting resistances. By Menges, (D.) 766.
  Synchronous, Influence on purer factors of three-phase stations. By Klasson, (D.) 77, 225.
    Stable and unstable. By Franklin, 271*.
  Theory of constant speed, direct current constant potential motors. By Baxter, Jr., 629, 633.
  Three-phase.
    Single-phase currents. By Dobrowolsky, (D.) 617.
    Variable number of poles. By Ziehl, (D) 391.
  Three-phase induction, Running of. By Morrison, (D.) 644.
Motors, Steam.
  N. Y. & N. E. Ry., 550.
  Serpollet, in France. By Thomieu, (D.) 676.
Motors, Wave, Fletcher system, (D.) 705.
Mulhouse Industrial Society prizes, (D. R.) 283.
Municipal Electrical Association, Manchester, (D.) 80, 104, 138.
Municipal ownership, (D.) 197; by Flower and Pavey, (D. R.) 80; Foote, (D.) 594; (D. R.) 169; Wright, (D. R.) 463, 539.
  Central stations, (D.) 197; By Grout, (D. R.) 253; Gray, (D.) 77; McVicar, (D.) 537; Winchester, (D. R.) 309, 422.
    Bolton, Eng., 5*.
    Detroit, (D. R.) 459, 563.
    Manchester, (D. R.) 422.
    Santa Clara. By Quinn, (D. R.) 539.
    Taunton, (D. R.) 677.
    Zurich, Report, (D. R.) 459.
  Glasgow, 58.
  Street railways, (D. 421; By Francisco, (D. R.) 364; Sullivan, 487; Vreeland, 332, 509.
Muscular electricity. By Wright, (D. R.) 541, 738.
Mutual inductance. By Houston and Kennelly, 358, 532, 581.

N

Nassau Ry. Co., Property burned, 302*.
National Street Lighting Association, Convention, 383.
Navy, Electricity in, 442; (D. R.) 395; By Dodge, 577.
Nerves, Excitation of. By Davilewsky, (D.) 138.
New York State Industrial School, Electricity at. By Freeman, 529*.
New York Street Railroad Association, Convention, 331*.
Newgard waterproof receptacle, 171*.
Newspaper knowledge of scientific matters, 90.
Niagara-Buffalo transmission line, 667.
Niagara Falls, Possible effacement, 293.
Niagara Falls plant. By Cazin, 57, 72, 100; Scott, (D. R.) 336; Stillwell, 40.
  Extensions. By Dunlap, (D. R.) 507, 705; Haskin, 492*.
Niagara Rapids, Electrical illumination of, 334.
Nickel.
  Deposition, from its sulphate of chloride. By Foerster, (D.) 460.
  Refining, American. By Ulke, (D. R.) 103.
  Tortion and magnetization of. By Cantone, (D. R.) 281, 365.
Nickel steels. By Guillaume, (D.) 136.
Nitric acid.
  Electric production. By Von Lepel, (D.) 253.
  Quantitative electrolysis of. By Ulsch, (D.) 137.
Nitrogen, Oxidation of. By Rayleigh, (D.) 679.
Nitrogen acids. By Baur, (D. R.) 540.
Nitrogurete. By Pauli, (D.) 394.
Nomenclature, Electrical, Need of precise, 694, 734.
Noreck waterproof bracket, 174*.
Northwestern Electrical Association Convention at La Crosse, Wis., 57, 114, 117.

O

Ohm.
  Determination of. By Jones and Ayrton, (D.) 366, 708.
  Lorenz apparatus, 703.
Oils.
  Dielectric strength of, Tests. By Northrup and Pierce, 549, 559; Steinmetz, 609.
  Specific resistance of. By Wadsworth, (D.) 423.
Omaha exposition, 4.
Orchestra lamp, Ward, 740*.
Oscillating charges. By Seiler, (D.) 46.
Oscillations. By Merritt, (D.) 103.
  Chemical action of electric. By Hemptinne, (D.) 540.
  Measuring frequency of. By Margaret Maltby, (D.) 619.
  Mutually inductive circuits, Theory of. By Houston and Kennelly, 35.
  Resonance. By Planck, (D.) 46, (D. R.) 136.
Ozone.
  Efficiency of ozonizers. By Andreoli, (D.) 462.
  Quantitative analysis. By Andreoli, (D.) 462.
  Researches with. By Blondin, (D.) 253; Prepognot, (D.) 394.
  Utilization of, (D.) 648.

P

Pacific Coast Electric Transmission Association, (D. R.) 463.
Palmer Electrical Instrument Co., 368.
Pan-American Exposition, 4.
Parabolic reflectors, (D.) 196.
Paragon motors, 368*.
Paris Exposition in 1900, 574.
  Traveling platform, (D.) 562.
Patent, Van Dopoele trolley, Judge Wallace's opinion, 91.
Patent system, American, Changes necessary, 238; By Mauro, 549, 557.
Pender memorial, 65.
Pennell condenser, 284*.
Perkins Mfg. Co.
  Fuse switch, 312*.
  "P. T." cut-out, 341*.
Petroleum lights compared with electric lights, (D.) 307.
Phase-shifting produced by a polarizer. By Malagoli, (D.) 103, 137.
Phœnix Interior Telephone Co.'s plant, 172*.
Phonograph in telegraphy. By Pierard, (D.) 227.
Phosphorescent lamp, Puluj system, (D.) 224.
Photo-electric currents. By Elster and Geitel, (D. R.) 226.
Photo-electric signal recorder, 195.
Photo-engraving lamp, 710*.
Photographs, X-ray, Solarization effects. By Robb, (D.) 310.
Photographs without light. By Russell, (D.) 646.
Photography, Photovoltaic currents in. By Luggin, (D.) 563.
Photometers.
  New. By Thompson, (D.) 310.
  Portable. By Preece and Trotter, (D.) 79.
  Weber, for measuring daylight, (D.) 738.
  X-ray. By Imbert and Bertin-Sans, (D.) 364.
Phylloxera, Remedy against, (D.) 171.
Pilot wires, Substitutes for, (D.) 706.
Pipe cutting and threading machine, 566*.
Pipes. (See Water pipes.)
Pittsburg feed-water heater, 369*.
Pittsburg Reduction Co., Manufacture of aluminum, 13.
Plating, Cleansing bath, (D.) 78.
Platinum, Resistivity at low temperatures, (D.) R.) 17.
Plows, Electric, Germany, (D.) 45, 76, 308, 457.
Polar differences in Tesla currents. By Pflueger, (D.) 16.
Polarization capacity. By Gordon, (D.) 78.

Pole lines. By Perrine, (D.) 169.
Portable installation, (D. R.) 337.
Potassium percarbonate. By Müller, (D. R.) 137.
Potential gradient, Atmospheric. By Cadet, (D.) 78.
Potential indicator, Keystone, 566*.
Potentiometer.
  Thierman. By Fry, (D.) 282.
  Universal, Elliott, (D. R.) 423.
  Willyoung direct-reading, 466*.
Polyphase currents, Apparatus for illustrating. By Wurstemberger, (D.) 78.
Powder maganzines, Wiring in, (D. R.) 77; By Violle, (D.) 46.
Power.
  Cost, in N. E. cotton mill, (D.) 421.
  District distribution. By Emery, (D.) 457.
  (See also Central stations.)
Pressing iron, Electrically heated, (D.) 104.
Prices.
  Effect of hard times on, 321.
  Electrical supplies, (D. R.) 252.
Printing plant electrically operated, 352*, (D.) 45; By Bishop, 406, 419*, 449*; Rathbun, (D. R.) 675.
Printing telegraphy.
  Hoffmann system, (D.) 647.
  Kamm "zerograph," (D.) 709.
  Photographic. By Eaton, (D.) 79, 338.
Propeller, Boat, Electric, New development, (D.) 706.
Pumping plant, Chicago, and electric light plant, (D.) 457.
Pumps, Electrically driven. By Simon, (D.) 562.
  Mines of France, (D.) 45.
Pyrometer, Platinum resistance, Researches with. By Tory, (D.) 364.

R

Rack railways, Abt system. By Corthell, (D.) 458.
Radiation. (See Light.)
Radiographs. (See Röntgen rays.)
Rail bonds. By Newton, 390; Harrington, (D.) 767.
  Harrington, 312*.
  Plastic, New type, 256*.
Rail joints.
  Cast-welded. By Mead, (D. R.) 16.
    Minneapolis, (D.) 508.
  Low joints and how to prevent them. By Allen, (D.) 538.
  Planing, in place, 489.
Rails, Girder, Use in England, (D.) 508.
Railway appliances, Recent developments in. By Baylor, (D. R.) 76.
Railway currents for private power purposes, (D.) 538.
Railway employees, Discipline of. By Davis, 489; Wheatley, (D. R.) 509.
Railway repair shop management. By Porter, (D. R.) 168.
Railways, Electric. By Gerry, Jr., 124, 152; Parham, (D.) 736; Pellissier, (D. R.) 252; Marshall, 760.
  Acceleration and braking. By Summers, (D.) 421; Potter, (D.) 508, 767; Cooper, (D.) 767.
    Chicago, Tests in, (D.) 508.
    Schenectady tests, (D.) 421.
  Accumulator traction. By Epstein, (D.) 676, 706, 767.
    Alternating-current, Deri system, 29, (D.) 45, 76.
    Application to car locomotive. By Hewett, 483.
    Berlin, Tests, (D.) 507.
    Chicago & Englewood road. By Damon, (D.) 196.
    Cologne. By Biggs, (D.) 593.
    Cost, compared with conduit system. By Braun, (D.) 392.
    Englewood & Chicago Ry., 469.
    Frankfort, Ger., (D.) 76.
    Germany. By Schroeder, (D. R.) 225, (D.) 422.
    Hanover, Mixed system, (D.) 507.
    Law of maximum work. By Fitz-Gerald, (D.) 280.
    Nice, (D.) 252.
    Ostende railway, (D.) 706.
    Paris, (D. R.) 135, 422; By Lasnier, (D.) 336.
    Zurich-Hirslanden. By Schroeder, 731*.
  Alexandria, Egypt, (D.) 676.
  Alternating current traction, (D.) 16; By Meyer, (D.) 168.
    Deri system, 29, (D.) 45, 76.
  Austria, Operation, (D. R.) 363.
  Behr monorail system, (D.) 46, 76, (D. R.) 168, 706.
  Belgium, Mons to Bousso, (D.) 676.
  Besbrook, (D.) 336.
  Binghamton. By Gardner, (D. R.) 539.
  Birmingham report, (D.) 168.
  Blackpool, Parsons' turbines (D.) 644.
  Boston subway, 272, 294; (D. R.) 280, 308; By Talbot, 295*.
  Bound Brook & Somerville, N. J., Construction in 24 hours, (D. R.) 594.
  Bradford, Eng., (D. R.) 538.
  Brussels-Tervueren, (D.) 46, (D. R.) 392.
  Budapest, (D.) 336, (D. R.) 507; By Braun, (D.) 392.
  Central London, High potentials, 1, 12*, (D.) 168.
  Charleston, Plant, (D.) 308.
  Chicago, (D. R.) 101.
    Metropolitan Elevated. By Gerry, Jr., 124.
    Replacing steam, (D.) 101.
    Suburban Co., (D.) 168, 308.
  Columbus, Ga. By Boileau, 275*.
  Commercial aspect of. By Carr, (D. R.) 16.
  Commutative system, 141*, 466.
  Compared with steam railway statistics. By Aspinwall, (D.) 676.
  Conduit system.
    Cost compared with accumulators. By Braun, (D.) 392.
    Hamburg, (D.) 225, 252.
    Lachmann, (D.) 76, 458, (D. R.) 135, 706.
    New York, 237, 239*, 328*, (D. R.) 252, 615*; (D.) 767.
    Washington, D. C. By Hopkins, (D. R.) 706.
  Construction and operation difficulties. By Knox, 488.
  Cost, Generation of energy, (D.) 392; By Raworth, (D. R.) 76.
  Damage cases, Settling of. By Hield, 488.
  Deri system, 29, (D.) 45, 76.
  Development of, 2; By Clark, 335.
  Diagnosis. By Billberg, 187.
  Dover, Eng., 326, (D. R.) 363, 457.
  Dublin, Extensions. By Bridge, 758.
  Economy in construction. By Pain, (D.) 16.
  Efficient transmission of power. By Conant, (D.) 168.
  England, Growing interest, 525.
  European, Notes on, (D.) 76, (D. R.) 197, 736.
  Fairmount Park, Phil., (D.) 196.
  Feeder lines, (D.) 252.
  Feeding, Equilibrium system. By Spagnoletti, (D. R.) 135.
  Freight service, Niagara County. By Dunlap, (D.) 508.
  Germany, Development. By Kolle, (D. R.) 336.
  Hanover, (D. R.) 168, (D.) 507.
  Hartford, Conn., (D. R.) 197.
  Henry commutative system, 141*, 466.
  Incline, on Mt. Tom, (D.) 168.
  Inspection methods. By Monroe, (D.) 197.
  Insulation, Methods of testing. By Porter, 61*.
  Italy, Three-phase, (D.) 421.
  Jungfrau, (D.) 308, 767, (D. R.) 562; By Berthier, (D.) 507; Strub, (D.) 336.
  Kansas City, Overhead construction, (D. R.) 197.
  Lachmann conduit system, (D.) 76, 458, (D. R.) 135, 706.
  Lausanne, (D.) 196, (D. R.) 507.
  Leeds, Eng., 641*, (D.) 308.
  Leipzig. By Eisig, (D. R.) 280.
  Longest trolley ride in the world, 456.
  Lorain-Cleveland, High speed. By Roberts, (D.) 538.
  Losses from stoppages of cars. By Hering, (D.) 76.
  Low voltage, Effects on motor circuits. By Cleveland, (D.) 76.
  Mechanical features. By Dawson, (D.) 225, 676, 706.
  Merchandise traffic, Suggestions. By Schiemann, (D.) 309.
  Mileage, World's, (D.) 457.
  Mileage record, Advantages of. By Nicholl, (D.) 538.
  Monorail system, (D. R.) 135.
  Montmorency. By Diendonne, (D. R.) 363.
  Montreal, Operation. By Cunningham, (D. R.) 363.
  Motor cars vs. electric locomotives. By Baxter, Jr., 132.
  Multiphase-current transmission. By Hoopes, 478, 479.
  Narrow-gauge portable railway, (D.) 594.
  Neuchatel, Three-phase traction, (D.) 706.
  New York, Conduit system, 237, 239,* 328*, (D. R.) 252, 615*; (D.) 767.
  Niagara River region, (D.) 508, 539.
  Paris, Accumulator traction, (D. R.) 135, 422; By Lasnier, (D.) 336.
  Paris exposition of 1900, (D.) 392.
  Phil., Power houses. By Gunton and Lomas, (D. R.) 507.
  Phil. and New York, Outline. By Davis and Williamson, (D.) 458, 562.
  Power consumption of cars, (D.) 458.
  Power distribution and use of multiphase-current transmission. By Hoopes, 478, 479.
  Prague, (D. R.) 676.
  Progress of twenty-five years. By Dawson, (D.) 706.
  San Francisco, Power house. By Hanscom, (D. R.) 252.
  Signals. By Parrish, (D. R.) 170.
  Single equipment, (D.) 280.
  Sliding contacts for. By Poschenreider, (D. R.) 225.
  Speed, Increase practical. By Tesla, (D.) 538.
  Sprague multiple-unit system, 149, 155*; By Summers, (D.) 421.
  Steep-grade system. By Bronsdon, (D.) 421.
  Surface-contact system, 515*.
    Diatto system, (D.) 308.
  Switzerland, Orbe & Chavornay. By Preller, (D. R.) 457.
  Tampa, (D. R.) 539.
  Tendencies of tramway traction. By Aldridge, 250.
  Testing. By Monroe, (D.) 676.
  Testing insulation and resistance of conducting circuits. By Porter, 61*.
  Three-phase.
    Italy, (D.) 421.
    Lachmann system, (D.) 458.
  Third-rail system.
    Crocker, (D.) 392.
    Doty-Macknight-Granten, 463*.
  Toronto, Feeder lines, (D.) 252.
  Track construction, (D. R.) 422.
  United States, Financial results, (D. R.) 197.
  Utah, New project, 734.
  Vienna, (D. R.) 538.
  Zermatt Gorner-Grat, 734, (D.) 280.
Railways, Elevated.
  Chicago.
    Alley road, Multiple-unit system, 149, 155*.
    Electric traction. By Gerry, Jr., 124, 152.
    Loop system, (D.) 458.
    Third-rail, (D.) 308.
  Electric traction. By Short, 159*.
  New York, Tests of air motors, 210, 294, (D.) 458.
  Third-rail system. By Short, (D.) 168.
Railways, Steam.
  Compared with electric railway statistics. By Aspinall, (D.) 676.
  Electric traction, 265, 437; By Brangs, (D.) 76; Forbes, (D.) 458; Gerry, Jr., 124, 152; Heft, 485; Hutchinson, (D.) 706; Langdon, (D.) 709; Short, (D.) 594.
  Accumulators, Wurtemburg, (D.) 225.
  Boston suburban roads. By Short, (D.) 508.
  Chicago, 149, 155*, (D.) 101, 308.
  Hungarian Government experiments, (D.) 706.
  N. Y., N. H. & H. Ry. By Heft, 485.
  Penn. Ry., Phil. suburban service. By Child, 443*.
  Switzerland, (D.) 76.
  Wilkesbarre, Pa., 560.
  London Underground, Electric traction proposed, (D.) 538.
  Long Island, East River tunnel and electrical equipment, 605, 607*.
  Northern R. R., France, Motor cars. By Thernieu, (D.) 676.
  St. Louis, Combined with electric traction, 100.
  Wilkesbarre, Pa., Trolley cars on railway, 560.
Range finders. By Richards, (D.) 596.
Rapid transit, New York problems, 350, 575*, 725, 749.
Rarefied gases in a high frequency field. By Ebert and Wiedemann, (D.) 563.
Rates. (See Charging for electrical energy.)
Ratio of electrostatic and electromagnetic units. By Hurmuzescu, (D.) 79.
Rays, Luminiscence of various rays. By Arnold, (D.) 77, (D. R.) 136.
  (See also Cathode rays; Röntgen rays.)
Receiver, Carbon, for Hertz waves. By Smith, 588.
Recorders, Excessive current, on railways, 710*.
Rectifiers.
  Alternating currents. By Graetz, (D.) 225.
  Arc lighting, England, 211*.
  Pollak system, (D.) 77, (D. R.) 138.
  Street lighting with. By Kensit, (D.) 167.
Rectifying alternating-currents. By Graetz, (D.) 197.
Reducing wheel, Buffalo, 369*.
Reflectors.
  Arc-light, (D.) 167.
  Parabolic, (D.) 196.
Refractive index of water and alcohol. By Cole, (D.) 136.
Refuse destructors and electric lighting, Shoreditch, 2, (D.) 76, 538, (D. R.) 136; By Perry, (D.) 735.
Regulators.
  Automatic, for constant potential. By Collischoun, (D.) 76.
  Heat and cold. By Richter, (D.) 541.
Reichsanstalt, Report of the, (D.) 79, 138.
Re-inspection of electrical fire risks. By Talbot, 636.
Reostene, Resistance of. By Van Aubel, (D.) 595.
Repair of railway apparatus, (D.) 508; By Dunning, (D. R.) 422.
  Brooklyn Heights Ry., (D. R.) 76.
Resistance.
  Accurate measurement. By Ayrton, (D.) 737.
  Calculating joint resistance. By Holden, (D.) 281.
  Determined by screening effect. By Erskine, (D.) 708.
  Electrolytic resistance measured with constant current. By Malstroem, (D.) 564.
  Measuring.
    Differential telephone method. By Frederico, (D.) 647.
    Direct-reading conductivity bridge. By Willyoung and Harth, 579*.
    Low resistances. By Santarelli, (D.) 461*.
Resistance coils.
  Heating error in. By Laws, (D.) 423.
  Permanency of. By Ayrton, (D.) 647, 708.
  Rating. By Zingler, (D.) 422, 459.
Resistance of conductors to variable current. By Brylinsky, (D.) 78, 253; Potier, (D.) 309.
Resistance of electrolytes under pressure. By Lussana, (D.) 103.
Resistance of salt solutions in motion. By Bose, (D.) 253.
Resonance, Multiple. By Decombre, (D. R.) 136.
Rheostats.
  Mueller form, (D.) 138.
  Water. By Willis and Merrill, (D.) 738.
Rheumatism, electric light treatment. By Kozlovski, (D.) 104.
Roller bearings, Requirements and details of construction. By How, (D.) 645.
Röntgen ray tubes.
  Adjustable. By Swinton, (D.) 169.
  Crookes.
    Electrical influence. By Courmelles, (D. R.) 253.
    Improvement in. By Villard, (D.) 46.
    Regulated while in action. By Villard, (D.) 364.
    Rice's self-regulating, (D.) 768.
    Rollins, (D.) 768.
    With attached bulbs. By Dell, 387*.
  Lenard, Construction of. By Tesla, (D.) 226.
  Rollins, (D. R.) 707.
  Swett & Lewis vacuum, 171.
  Willyoung & Co., 650*.

Röntgen rays, (D.) 539; By Hale, (D.) 17; Porter, (D.) 365; Vollar and Walter, (D.) 253; Wilkins, (D.) 136.
  Absorption of. By Buguet, (D.) 422; Humphreys, (D.) 646.
  Actino-electric effects of. By Guggenheimer, (D.) 169.
  Action on the retina. By Bardet, (D.) 103.
  Animals, Action of rays on temperature. By Lecercle, (D.) 281.
  Burns from, (D.) 646; By Destot, (D.) 46; Sharpsteen, (D.) 78; Woods, (D.) 365, 707.
  Cathode. (See Cathode rays.)
  Chemical constitution. By Gladstone and Hibbard, (D.) 540.
  Comparison with other types of radiation. By Precht, (D.) 77, (D. R.) 136.
  Complexity of. By Imbert and Bertin-Sans, (D. R.) 253.
  Custom house application, (D. R.) 226.
  Cutaneous evaporation, Action of X-rays on. By Lecercle, (D.) 678.
  Deflection, Magnetic. By Stokes, (D.) 281.
  Dermatitis due to rays, (D.) 103.
  Diffusion phenomena. By Thomson, (D.) 17.
  Discharge by, Action of electric charges on. By Villari, (D. R.) 253.
  Dissociation properties. By Guillaume, (D. R.) 337.
  Emissivity of metals. By Kaufmann, (D.) 364.
  Energy conditions necessary to produce rays. By Trowbridge, (D.) 595.
  Exhibitions at Royal Society Conversazione, (D.) 46.
  Experiments in 1708, (D.) 77.
  Experiments with the "metallic effect." By Perrin, (D.) 337.
  Identity with cathode rays. By Battelli, (D.) 102.
  Intensity of. By Röntgen, (D.) 136, 169.
  Localizing embedded objects. By Davidson and Hedley, (D.) 595.
  Magnetic deflection. By Metz, (D.) 646.
  Metals examined by. By Radignet, (D.) 253.
  New uses for, 58.
  Photographs.
    Pin hole. By Czermak, (D.) 253.
    Solarization effects. By Robb, (D.) 310.
  Physiological effects of. By Balthazard, (D.) 768.
  Production, Simultaneous with light. By Commelles, (D.) 46.
  Progress, Recent, (D.) 46.
  Properties of gases traversed by. By Sagnac, (D. R.) 253.
  Protective screens. By Thomson, (D.) 423.
  Radiographs. By Buguet, (D.) 364; Sequy, (D.) 678.
    Haziness in. By Chaband, (D.) 619; Villard, (D.) 281.
  Source of. By Galitzin and Karnojitzky, (D.) 17; Tesla, (D.) 226.
  Surgery, Application to, (D.) 78.
  Theory of. By Vosmer and Ortt, (D.) 337.
  Thomson's speculations, 2.
  Transformation by metals. By Sagnac, (D.) 281.
  Transparency of vapors. By Van Autel, (D.) 595.
  Tubercle bacillus, Experiments. By Pott, (D.) (D.) 737.
  Visibility of. By Brandes and Dorn, (D. R.) 103.
  Wave length. By Precht, 721, 726*.
Röntgen Society, England, (D. R.) 707
Roth multipolar dynamo, 311*.
Rubies, Production of, (D.) 170.
Rudders, Electric device for moving, (D. R.) 224.
Rules for electric installations. By O'Gorman, (D. R.) 393.
  Countries other than France, (D.) 677.
  Germany, High-voltage installations, (D.) 226, (D. R.) 422, 768.
  Institution of Electrical Engineers, (D.) 253.
  Insurance companies, England, (D. R.) 198.
  London report, (D.) 102.
  National code, 60.
  Switzerland, (D. R.) 563.
Rushmore multi-circuit arc dynamo, 313*.

S

Safe-breaking by electricity, 712; By Howard, (D.) 104; Scheible, (D.) 138.
St. Elmo fires on the seas. By Haltermann. (D.) 255.
St. Luke's Hospital, Electricity at, 327*.
Salts.
  Colors produced by cathode rays. By Goldstein, (D. R.) 136.
  Moisture in, Determination of, (D.) 394.
Sand box, Brill Co., 565.
Scales, Glass, Illuminating. By Martens, (D.) 738.
Schulte's trolley wire hanger, 313*.
Science, Definition of, 210.
Screening action of metallic cylinders. By Erskine, (D.) 459.
Screening by luminous gases. By Wiedemann and Schmidt, (D. R.) 707.
Searchlights and election returns in New York, 575*.
Selenite, Electric waves in. By Righi, (D. R.) 540.
Self-induction. (See Inductance.)
Sellenite, Electromagnetic wave form in. By Righi, (D. R.) 136.
Separator, Steam and oil, Bundy, 682*.
Sewage.
  Electrolyzed sea water for purification of. By Hewett, (D.) 460.
  Purification by electrolysis, (D.) 619.
Shatfing vs. electricity in the machine shop. By Benjamin, (D.) 224.
Sheep shearing by electricity. By Dickinson, 218*.
Ship lights, (D.) 279*.
Ship models, Testing. By Price, (D.) 709.
Shipyards, Electric power in, (D.) 705.
Shop drawings, Method of keeping, 341.
Shop practice, Electrical machines. By Hobart, (D.) 15.
Shops. (See Factories and shops.)
Siemens & Halske Co.
  Jubilee. By Howe, (D. R.) 541.
  Penn. Iron Wks. Co., 241.
Signal, Revolving-field signaling gear. By Arldt, (D.) 338.
Signaling, Railway.
  Block system.
    Bond system, (D.) 104.
    Single track, Germany, (D. R.) 394.
  Electric railway. By Parrish, (D. R.) 170.
Sinking fund, Calculation of. By Mogensen, (D.) 539.
Smelting and metal-working process, Electric, Burton's devices, 597*.
Snyder microphone, 465.
Sockets. (See Incandescent lamp sockets.)
Soda, Electrolytic, Hulin process, France, (D.) 708.
Sodium, Castner process, (D.) 227.
Sodium chloride, Decomposition of. By Lorenz, (D.) 737; Beebe, (D.) 17.
Sodium peroxide, Manufacture at Niagara Falls. By Dunlap, (D.) 17.
Soldering iron, (D.) 19, 138.
Sound, Feeling. By McKendrick, (D.) 199.
Sounding apparatus. By Babcock, (D. R.) 511.
Spark, Electric.
  Constitution of. By Schuster, (D.) 309.
  Discharge of. By Pettinelli, (D.) 280.
  Retardation. By Wireburg, (D.) 677.
  Heat of. By Kaufmann, (D.) 280.
  Minute spark gaps. By Salvioni, (D.) 736.
  Potentials, Static and dynamic. By Swyngedauw, (D.) 103.
Specific heat, Electrical determination of. By Callender and Barns, (D.) 310.
Specific inductive capacities. By Guillaume, (D.) 169.
Spectrophotometry of incandescent lamps. By Turnbull, 43.
Speed indicator, Bicycle. By Meylan, (D.) 564.
Spherical conducting shell. By Whitehead, (D.) 281.
Sprague Electric Co., 439*.
Sprinkler systems, Alarm for, 712*.
Stage, Use of electricity on. By Bissing, 3, 536; Baehr, (D.) 45.
Standard boilers, 514*.
Star annunciator, 81*.
Static machine, Large, 340*.
Stations, Railway, Electric lighting of, (D. R.) 393.
Steam, Exhaust, Utilization of. By Thayer, 130.
Steam engines. (See Engines.)
Steam motors.
  N. Y. & N. E. Ry., 550.
  Serpollet, on French railway. By Thomieu, (D.) 676.
Steam power.
  Compared with other power systems. By Emery, (D.) 457; Taylor, (D. R.) 705.
  Prussia, (D.) 766.
  Reduction in cost of, 696.
Steam turbine, High-speed rotation. By McElroy, 454*.
Steamers.
  "Bremen," Electric power on; 172*.
  "Dresden," Electric plant, (D. R.) 225.
  Electricity on, (D.) 224; By Durand, (D.) 102; Kellogg, (D. R.) 367.
  "Kaiser Wilhelm," Electric lighting of, 384*.
  "Rotterdam," Lighting plant, 305*.
Steel.
  Allen, High magnetic quality. By Jackson, (D.) 679.
  Electro-zincing. By Cowper-Coles, (D.) 737.
  Magnetic properties of soft steel. By Abt, (D.) 459.
  Magnetic tests of open hearth cast steel, (D.) 768.
  Secular softening of hard steel. By Barns, (D.) 769.
Steinmetz's exponent. By Weiler, (D.) 619.
Stone, H. B., Biographical sketch, (D. R.) 80.
Storms and the solar period. By Zenger, (D.) 422.
Stove, Electric laboratory, (D.) 648.
Street lighting, (D. R.) 135; By Boot, Fedden and Taite, (D.) 101.
  Advantages of different systems. By Proctor, (D. R.) 336.
  Costs in different cities. By Hunter, (D.) 537.
  Enclosed arc lamps for, 658.
  Rectifiers, Use of. By Kensit, (D.) 167.
Street Railway Association of the State of New York, 274.
Street railway engineering. By Cahn, (D.) 458.
Street railways.
  Accidents, Prevention of. By Cooper, (D.) 538.
  Battle of the motive powers, (D.) 508.
  Compressed air for, (D.) 458.
  Diagnosis. By Billberg, 187.
  Mileage and capitalization in America, (D.) 508.
  Municipal control, (D.) 421; By Francisco, (D. R.) 364; Sullivan, 487; Vreeland, 332, 509.
  Paris, Mechanical traction, (D.) 168.
  Steam cars, Serpolet system, (D. R.) 197.
  Sydney, N. S. W., (D.) 508.
  United States, Financial results, (D. R.) 197.
  (See also Cable railways; Railways.)
Strikes, Telegraph, England, 182.
Strontium amalgam. By Guentz and Feree, (D.) 365.
Submarine cables. (See Telegraph cables.)
Submarine navigation. By Holland, (D.) 252.
Submarine vessel, Pozzo. By Bailly, (D.) 310.
Sugar, Bleaching, Urbain process, (D.) 646.
Sugar factories, Electrolysis in. By Schollmeyer, (D.) 137.
Sulphides, Action of high temperature on. By Mourlot, (D. R.) 365.
Sulphur, Chemical decomposition of. By Gross, (D.) 253.
Surgical incandescent lamp. By Hickman, (D.) 593.
Swett & Lewis vacuum tubes, 171*.
Switch panel for railway tests, (D.) 706.
Switchboards.
  Arc circuits. By Dow, (D.) 168:
  Power station. By Moffat, (D. R.) 76.
  Storage battery, 229*.
  Three-phase.
    Evolution, Baltic Power Co. By Raymond, (D. R.) 509.
    Strassburg central station, (D. R.) 509.
Switches.
  Anderson quick-break, 513*.
  Combination, for lamps, (D.) 509; By Fish, (D.) 509.
  Double-end switch arrangement. By Putnam, (D. R.) 279.
  General Electric., 567*.
  Hope 600-ampere, 463*.
  Leroy universal, (D.) 279.
  Multiple, for three-wire circuits. By Van Deth, (D.) 677.
  Perkins fuse, 312*.
  Three-wire system, with one reserve booster. By Gruhn, (D.) 676.
Synchronograph, American system, (D.) 18.

T

Tachometers.
  Mathematical accuracy, 396*.
  Recording. By Jones, (D.) 18.
Tangent phase-meter. By Arno, (D.) 394.
Tanning, Electric. By Roever, (D.) 253.
Technical education by mail, 683*.
Telegraph cables.
  Air space, Smith and Granville, (D.) 170.
  Breaks, Method of localizing. By Schaefer, (D.) 541, 595.
  Capacity of, (D. R.) 738.
  Construction and laying. By Bright, (D.) 709; Snell, (D. R.) 48.
  Disturbance by electric railways, 14.
  Fractures due to landslides. By Milne, (D.) 48.
  Iceland and Scotland, 439.
  Scotland to Iceland, 383.
  Speed, Limits of. By Price, (D.) 227.
  Workings with. By Sayers and Grant, (D.) 104, 170.
Telegraph call, Wetzer system, (D.) 394.
Telegraph lines.
  Earth currents in. By Cottrell, (D.) 595.
  Indicating repaired fault. By Dehms, (D.) 619.
Telegraph poles, Iron, France. By Dubreuil, (D.) 18.
Telegraph relays.
  Low resistance. By Fry, Thayer and Ryder, (D.) 138.
  Relation to telegraph circuit. By Lockwood, (D.) 79, 138, 255.
Telegraph strike, England, 182.
Telegraphic annunciators. By Montpellier, (D.) 647.
Telegraphy. By Hess, (D.) 769.
  Accumulators.
    Europe, (D.) 541.
    Wilmington, Del. By Wright, (D.) 462.
  Alaska-Russian telegraph line. By Fessenden, 150, 151.
  Ancient. By O'Gorman, (D.) 138.
  Automatic system. By Delany, (D.) 48, 79.
    Weiny-Phillips system, 19*.
  Balancing duplex and quadruplex apparatus. By Skirrow, (D. R.) 541.
  Combined with telephony. By Porney, (D.) 541.
  Dejongh diplex system. By Tobler, (D. R.) 79.
  Early ideas, (D.) 564; By Maver, (D. R.) 339.
  England, Instruments used. By Herd, (D.) 338.
  First practical telegraph, England. By Preece, (D.) 394.
  Great Britain, History. By Bright, (D. R.) 338.
  High-speed, Alaska-Russian telegraph line. By Fessenden, 150, 151.
  Hughes transmission with Baudot relays. By Tobler, (D. R.) 282.
  Klondyke line proposed, 251, 574.
  Length of lines in the world, (D.) 424.
  London, Underground cable, (D.) 338.
  Military.
    Development. By von Fischer-Treuenfeld, (D.) 709.
    Gen. Greely's report, 581, (D.) 647.
  Morse, Royce system, (D.) 367.
  Overhead line to Europe, (D. R.) 339.
  Phonograph in. By Pierard, (D.) 227.
  Printing.
    Hoffmann system, (D.) 647.
    Kamm "zerograph," (D.) 709.
    Photographic. By Eaton, (D.) 79, 338.
  Progress in twenty-five years. By Preece, (D.) 709; Tobler, (D.) 282.
  Quadruplex, Roberson system, (D.) 423.
  Rapid systems. By Summers, (D.) 541.
  Secondary stations on the same line. By Montillot, (D.) 338.
  Simultaneous with telephony. By Tobler, (D.) 227.

Telegraphy. (Continued.)
Speed tests, in Belgium, (D.) 394.
Submarine.
Burke system, (D.) 48.
Conductivity of sea water. By Whitehead, (D.) 18.
Rapid, Queen's message, (D. R.) 48.
Receiver, (D.) 79.
Recorder, Ader photographic. By Rossel, (D.) 282, 596.
World's mileage, (D.) 769.
Thermo piles for telegraph work. By Athearn, (D.) 255.
Vocabulary for code telegrams, (D. R.) 596.
Wireless. By Guillaume, (D.) 170; Hertz, (D. R.) 394; Lodge, 29, (D.) 48; Slaby, (D.) 708, 738.
Commercial considerations, (D.) 199.
Edison patent of 1892. By Benest, (D.) 709.
London company formed, 181.
Marconi system, (D.) 138, 394, 411, 424, 564; By Briggs, (D. R.) 227; Dowsett, (D.) 462; Kay, (D. R.) 424; Kennedy, (D.) 596; Minchin, (D.) 541.
Spezzia experiments, (D.) 462.
Telephone cabinets, (D. R.) 104.
Telephone connections, Special. By Connaughton, (D.) 282.
Telephone factory, Phœnix Co., 172*.
Telephone meters. By Graetsch, (D.) 227.
Telephone receivers.
Lallie receiver, (D.) 79.
Polarized. By Giltay, (D.) 18, 170.
Telephone relays, Erdman, (D.) 647.
Telephone translators, Efficiency of. By Reding, (D.) 511.
Telephone transmitters, New forms on French lines, (D.) 48.
Telephone wires. By West, (D.) 709.
Joints, Resistance of. By Dobbs and North, (D.) 677.
Telephones.
Cosmo designs, 397*.
Induction, Prevention of, by railways, (D.) 709.
Nickel stress. By Garrett and Lucas, (D. R.) 104, 424.
Sensitiveness and its use for measuring. By Franke, (D.) 510.
Telephony. By West, (D.) 709.
Accumulators, Europe, (D.) 541.
American practice. By Miller, (D.) 282, 680.
Binghamton. By Gardner, (D. R.) 394.
Brussels, (D. R.) 564.
Buenos Ayres, 387.
Chicago, Load lines, (D.) 648.
Club line circuits. By Fitch, (D.) 738.
Connections between three metallic circuits. By Canter, (D. R.) 338.
Development, since 1876. By Kingsbury, (D. R.) 709.
Disturbances on lines, (D.) 199.
Electrophone in London theatres. By Wright, (D.) 367.
Europe, Statistics, 1895, (D.) 619.
Government departments, 360.
Great Britain, Systems. By Raphael, (D. R.) 462.
Hartford exchange, (D. R.) 339.
Isolated telephone lines. By Miller, (D.) 79.
Life-saving service. By Bolton, (D.) 462.
Lighting currents used. By Smith, (D.) 310.
Middle station. By Mattausch, (D.) 367.
Montreal station, (D.) 367.
Multiple systems, Development. By Hellrigl, (D. R.) 680.
National Telephone Co.'s system, London. By Wright, (D.) 462.
Peculiar phenomena during storm. By Lorrance, (D.) 282.
Pierard automatic system, (D.) 680.
Police service in New York, (D.) 769.
Private branch exchanges, (D.) 709; By Smith, (D.) 79.
Progress. By Hess, (D.) 462.
Reis's researches. By Sabarly, (D.) 338.
Richmond, Va., Judge Goff's decision, 238.
Selective call system, 468.
Simultaneous, with telegraphy. By Tobler, (D.) 227.
Spain, Interurban. By Pierard, (D. R.) 338.
Statistics, 1895, (D.) 511.
Strowger automatic exchange, Augusta, Ga., (D.) 199.
Submarine cables. By Barbarat, (D.) 310.
Sweden, Extent, (D.) 367.
United States, History, (D.) 79.
Western Electric Telephone system, 762.
Temperature and electric discharge. By Pandolphi, (D.) 77.
Temperature coefficient, Determining. By Lowe, (D. R.) 104.
Temperature measurements, Thermo-element for, (D. R.) 138.
Tennessee Centennial, Electrical features, 409*; By Williams, (D. R.) 367.
Terrestrial magnetism, (D.) 198; By Eschenhagen, (D.) 281, 510; Wilde, (D.) 563.
Gauss theory. By Berzold, (D.) 423.
Testing apparatus, A new magnetic. By Treat and Esterline, 696*.
Thallium, Recovery of. By Foerster, (D.) 394.
Theatre plant, London, (D. R.) 280.
Therapeutics.
Meters for electro-therapeutic work, (D.) 647.
Undulatory currents in. By Meylau, (D.) 48; Apostoli, (D.) 283.
Thermo-electricity, Researches with platinum resistance pyrometer. By Tory, (D.) 364.
Thompson, S. P., 249*.
Thun & Janssen wire-braiding machine, 201*.
Tires, Comparison, Traction resistance of carriages, (D.) 645.
Titration, Galvanometer method of. By Salomon, (D.) 226.
Track construction.
Eleven different methods, (D. R.) 422.
Minneapolis, (D.) 508.
Trains, Energy absorbed by, 154; By Gerry, Jr., 125.
Transformer sub-stations, Leicester. By Steinitz, (D. R.) 459.
Transformers.
Construction. By Carhart, (D.) 252; Wolcott, 362.
Design, construction and test. By Carhart, 323*, 556.
Development during twenty-five years. By Swinburne, (D.) 705.
Hysteresis loss, Form of voltage curve. By Fleischmann, (D. R.) 279, 644.
Iron losses. By Burnie, (D.) 307.
Mathieson Alkali Works at Niagara Falls. By Haskin, 630, 637*.
Phase. By Lombardi, (D.) 336, 705, 766.
Probst system of protecting, (D. R.) 736.
Protecting device, 49*.
Regulation, Predetermination, with non-inductive load. By Bedell, Chandler & Sherwood, Jr., 190.
Rotary. By Bell, (D.) 507.
Effective value of alternating currents. By Routin, (D.) 15.
Mathieson Alkali Works. By Haskin, 637*.
Theory of. By Steinmetz, (D.) 15.
Schlatter cut-out, (D.) 618.
Switches and fuses for concentric system, (D.) 707.
Tesla system, High potential, (D.) 644.
Testing, High-potential, 340*.
Transmission of electric power.
Alternating-current apparatus. By Raymond, (D.) 196.
Cities of the future. By Mullin, (D.) 593.
Construction of lines. By Eastwood, (D.) 539.
Economy and distribution. By Ferguson, (D.) 363.
Future possibilities. By Perrine, (D.) 45.
Naval vessels. By Dickie, 699.
New system of distribution, 100.
Niagara Falls. (See Niagara.)
Progress of twenty-five years. By Kennedy, (D.) 705.
30,000 volts, Salt Lake City, (D.) 767.
Three-phase system, Formulas for currents. By Vogel, (D.) 279.
Transmission plants.
Blue Lakes City, Cal. By Low, 573, 589*.
Chambly Mfg. Co., Quebec, 407*.
Geneva, Continuous current. By Friedmann, (D.) 252, 308.
Lachine Rapids, Montreal, 377, 379*.
Los Angeles, Proposed, 48.
Mechanicville-Schenectady, 418; By Steinmetz, 573, 586*.
Nelson, B. C., Proposed, (D.) 308.
Newcastle-Sacramento, 723*.
Ogden, Utah, 81*, 440*; By Goldmark, (D.) 75.
Salt Lake City, 30,000 volts, (D.) 767.
Sierran. By Low, 647, 589*.
Southern California Power Co., 80-mile, (D.) 75.
Switzerland, Various. By Spence, (D.) 675.
Three Rivers, Quebec. By Leyden, 414*, (D.) 562.
Trans-Mississippi exposition, 439.
Transmitter, Belt, L. P. & D., 542*.
Traveling platform at the Paris exposition, (D.) 562.
Trolley carriage for common roads. By Coleman, (D.) 197.
Trolley patent, Van Depoele, Judge Wallace's opinion, 91.
Trolley poles.
Iron, Nat. Tube Wks. Co., 256*.
Preservation of. By Montpellier, (D.) 16, 618.
Trolley wire hanger, Schulte's, 313*.
Trolley wires.
Calculation of. By Rasch, (D.) 135.
Test of English and American, (D.) 645.
Trucks.
Brill electric car, 469*.
Construction of. By Dunning, (D. R.) 509.
Street railway, German, (D. R.) 676.
Tunnels, East River, Long Island R. R., 605, 607*.
Turbines.
Dayton, 514*.
Hercules. By Reyval, (D. R.) 664.
Laval. By Reyval, (D.) 562, 644.
McCormick, 428*.
Parsons, for Blackpool Ry., (D.) 644.
Steam.
Development of. By Parsons, (D. R.) 644.
High-speed rotation. By M'Elroy, 454*.
Turntables, Electric operation, (D.) 675.

U

Underwriters' National Electric Association, Meeting of Electrical Committee, 758.
United Correspondence Schools, New York City, 683.
Units.
Fundamental, in the absolute systems. By Malagoli, (D.) 18, 338; Brylinski, (D.) 138.
Ratio between electrostatic and electromagnetic units. By Maltby, (D.) 199.
Uranium.
Discharge of electrified, in air. By Becquerel, (D.) 281.
Production. By Moissan, (D.) 47.
Uranium rays, Researches with. By Becquerel, (D. R.) 77.

V

Vacuum discharge, Influence of magnetization on. By Melani, (D.) 422.
Vacuum tube lighting.
Vacuum tubes, Glow in. By Ebert and Wiedemann, (D.) 422.
Vacuum tubes in magnetic fields. By Melani, (D.) 102.
Ventilator, Direct-connected motor and fan, 311*.
Viscosity and dielectric stress. By Quincke, (D.) 422.
Viscosity of insulating liquids in electric field. By Quincke, (D.) 618.
Voltage, Loss of, from conductor in air. By Oberbeck, (D.) 17.
Voltaic action of the proximity of substances. By Gore, (D.) 678.
Voltameter, Polarization capacity of membranes. By Grimaldi and Platania, (D.) 768.
Voltmeter resistance curves, Weston, (D.) 199.
Voltmeter switch for accumulators, (D.) 252.
Voltmeters.
French Edison Co. By Rocher, (D.) 47.
Registering. By Arnoux, (D. R.) 18.
Series-arc stations. By Dow, (D.) 225.
Silver, (D.) 47.
Standard electrostatic. By Perot and Fabry, (D.) 18.

W

Wagner switchboard instruments, 395*.
Wagon haulage, Electric, Chicago, (D.) 392.
Walker Mfg. Co.
Car controller, 620*.
Dynamos, 770*.
Reorganization, 661.
Ward orchestra lamp, 740*.
Warships.
Auxiliary engines and transmission of electric power. By Dickie, 699.
Electricity on Japanese "Fuji." By Grove, (D. R.) 135.
Water.
Electrolysis of. By Nernst, (D.) 310.
Sterilization by ozone. By Andreoli, (D.) 541.
Sterilization by the high-tension current. By Andreoli, (D.) 255.
Water cooler, Evaporation, 714*.
Waterfalls, Æsthetics of, 293.
Water level recorders. By Finch, (D.) 227.
Water pipes, Electrolysis. By Knox, (D.) 337.
Chicago, (D.) 337, 645.
Prevention. By Brown, (D.) 538.
Washington, D. C., (D.) 645.
Water power.
Blue Lakes City, Cal. By Low, 573, 589.
British Columbia development, (D.) 308.
Measurement of. By Field, (D.) 538.
Norway, New, (D.) 675.
Washington. By Darrow, 490*.
Water rheostats. By Willis and Merrill, (D.) 738.
Water wheels, Governing of dynamo-driving wheels, 534*; (D. R.) 538.
Water works pumping plant, Chicago, and electric lighting, (D.) 457.
Wattmeters.
Astatic recording, 513*.
Calibrating a recording, (D.) 79.
Recording, for street cars, 464*.
Thomson, Accuracy of. By Sessions, (D.) 462.
Thomson recording. By Ayrton, 302.
Wave motors, Fletcher system, (D.) 705.
Weather station, Permanent aerial. By McTighe, (D.) 541.
Welding, Electric.
New process, (D.) 769.
Voltex process, (D.) 738.
Western Electric Co.
Bell hanger, 228*.
Engines, 369*.
Westinghouse Electric & Mfg. Co. engine type alternators, 681*.
Westinghouse Machine Co. gas engine and dynamo, 105*.
Weston triplex hoist, 740*.
Wheatstone bridge, Construction of. By Hobart, (D. R.) 738.
William Ellison & Sons Mfg. Co., 427*.
Willyoung potentiometer, 466*.
Wimshurst machines, Sectorless. By Keenan, (D.) 199.
Wire-braiding machine, Electric, 201*.
Wire manufacturers, Proposed consolidation of, 576, 614, 728.
Wires.
Calculation of. By Behne, (D.) 102.
Different voltages from one lead. By Penman, (D.) 199.
Three-phase systems, 38*; By Cahen, (D.) 46, 198; Szapiro, (D.) 136, 309.
Distribution of alternating currents in cylindrical wires. By Merritt, (D.) 169.
Failure of German silver and platinoid. By Appleyard, (D.) 769.
Modern construction and maintenance of lines. By Brophy, (D.) 539.
Rating resistance spirals. By Zingler, (D.) 422, 459.
Test of insulated. By Stone and Webster, (D.) 707.
Underground, St. Louis. By Cosby, 217*.
Wiring. By Sharpsteen, (D.) 46, 102.
Earth connections, (D.) 645.
England, Free wiring syndicate, (D.) 422.
Fire switches, 223.
Free, in England, (D.) 422.
Interior, Practical details, (D. R.) 198.
Iron-armored conduits, (D. R.) 280.
Lecher system, Distribution of electric waves. By Apt, (D. R.) 77.
Municipal aid. By Gibbings, (D.) 77.
Powder magazines, (D. R.) 77.

Wiring. (Continued.)
Protection against dangers of high-tension distribution. By Claude, (D.) 618.
Re-inspection of electrical fire risks. By Talbot, 636.
Siemens & Halske system. By Hundhausen, (D. R.) 563.
Supporting large conductors. By Sharpsteen, (D.) 645.
Switches for two lamps, (D.) 509*.
Testing interior wiring, (D.) 364.
Wiring. (Continued.)
Three-wire secondary wiring. By Thorne, (D.) 509.
Tubing for interior work, (D.) 46; By Zingler, (D.) 16; Venable, (D. R.) 422.
Underground systems in England. By Blaikie, (D.) 169.
Wiring appliances, Defects in design. By Gardner, (D.) 707.
Wood.
Non-inflammable. By Ellis, (D.) 459.
Wood. (Continued.)
Refraction and conductivity. By Mazzotto, (D.) 595.
Z
Zamel arc-light meter, 199*.
Zinc.
Electro-deposition of. By Cowper-Coles, (D.) 708.
Electro-metallurgy of, (D.) 47.
Zinc plating steel wires, (D.) 254.

AUTHOR INDEX.

A.
Aldbridge, J. G. W. Present tendencies of electric tramway traction, 250.
Ayrton, W. E. The Thomson meter, 302.

B.
Baxter, William, Jr. Motor cars vs. electric locomotives, 132*.
Theory of constant speed, direct-current, constant potential motors, 633.
Bedell, F., Chandler, R. E., and Sherwood, R. H., Jr. Predetermination of the regulation of a transformer with non-inductive load, 190*.
Billberg, C. Street-railway diagnosis, 187*.
Bishop, R. R. Electric power for operating printing and binding machinery, 419*, 449*.
Bissing, H. Electricity on the stage, 3.
Storage batteries on the stage, 536.
Boileau, W. E. Electrical equipment of a Southern city, 275*.
Bridge, A. H. Extension of the electric-railway system in Dublin, 758.
Brinckerhoff, H. G. Proper construction and use of economizers, 639.

C.
Carhart, H. S. Design, construction and test of a 1250-watt transformer, 323*.
Transformer efficiency, 556.
Cazin, F. M. F. Niagara power, 72*.
Chandler, R. E., Bedell, F., and Sherwood, R. H., Jr. Predetermination of the regulation of a transformer with non-inductive load, 190*.
Child, C. T. Electric traction for the Pennsylvania Railroad Company's suburban service near Philadelphia, 443*.
Clark, W. J. A decade of electric-railway development, 335.
Crosby, F. C. Conduit construction in St. Louis, 217*, 242*, 267*.

D.
Darrow, Eleazar. Water power resources of the State of Washington, 490*.
Davis, G. H. Discipline of employees, 489.
Dell, A. G. Some experiments with Crookes tubes, 387*.
Dickie, G. W. Auxiliary engines and transmission of power on naval vessels, 699.
Dickinson, W. D. Sheep shearing by the aid of electricity, 218*.
Dodge, O. G. Advantages of electrical distribution in navy yards, 577.

F.
Fleming, J. A. Liquid air as an insulator, 325.
Freeman, J. T. Electricity at the New York State Industrial School, 529*.

G.
Gerry, M. H., Jr. Electric traction, 124*, 159*.
Gill, J. L. W. On a new method of measuring hysteresis in iron, 272.
Gunton, H. C., and Lomas, Harold. Electric lighting at Bolton, England, 5*.

H.
Hall, S. P. A physical theory of electricity and magnetism, 10.
Hanchett, G. T. Construction of induction coils, 59*.
Setting up of large generators, 665.
Harth, H. P., and Willyoung, E. G. Conductivity measurements with a direct-reading conductivity bridge, 579*.
Haskin, J. R. Electrical equipment of the Mathieson Alkali Works, 637*.
Extension of the Niagara wheel pit, 492*.
Haskins, C. C. Fowler's electro-plating secret, 355.
Haskins, C. D. Electric metering from the station standpoint, 121.
The influence of accurate measurements upon economic operation, 361.
Heft, N. H. Application of electricity to railroads now operated by steam power, 485.
Hellweg, J. H., Jr. Electricity direct from carbon, 96.
Hering, Carl. Efficiency of electric heaters, 195.
Hewett, Charles. Application of the storage battery to electric traction, 483.
Hield, W. J. Best method of settling damage cases, and the prevention of accidents by the use of fenders or otherwise, 488.
Hobart, J. F. A "surface-plate" balancing rig, 505*.
Fire switches, 223.
Some cheap ash cars, 278.
Trolleys down, or lamps burning, 248.
Hoopes, Maurice. Power distribution and the use of multiphase-current transmission for ordinary street railways, 479.
Houston, E. J., and Kennelly, A. E. Alternating-current machinery, 8*, 63*, 194*, 244*, 300*, 358*, 452*, 532*, 581, 638, 727*.
Theory of electric oscillations in mutually inductive circuits, 35.

J.
Jackson, J. P. Economy and utility of electrical cooking apparatus, 122.

K.
Kennelly, A. E. (See Houston.)
Knox, G. W. Difficulties existing in the construction and operation of electric street railways, 488.

L.
Leyden, H. R. The electrical power transmission plant at Three Rivers, Quebec, 414*.
Lockwood, J. E. Standardizing electric generators, 299.
Lomas, Harold, and Gunton, H. C. Electric lighting at Bolton, England, 5*.
Low, G. P. A Sierran transmission plant, 589*.
Lutoslawski, M. Lighting systems in Russia, 36.

M.
Marshall, Cloyd. Electric traction, 760.
Mauro, Philip. The American patent system, 557.
McElroy, J. F. Phenomena of high-speed rotation, 454*.

N.
Newton, H. C. Track bonding—How can we obtain the best results?, 390.
Northrup, E. F., and Pierce, G. W. Observations on the dielectric strength of oils, 559, 755.
Northrup, E. F., and others. Experiments in induction with currents of high frequency at long distance, 732*.

P.
Perkins, A. H. Plant of the Electric Light Company, 42.
Phillips, T. D., and Swain, J. G. Test of a coal-mining electric power plant, 93*.
Phisterer, F. W. A study of electrical insulation, 554, 583.
Pierce, G. W. and Northrup, E. F. Observations on the dielectric strength of oils, 559.
Pierce, G. W., and others. Experiments in induction with currents of high frequency at long distance, 732*, 755.
Pitcher, F. H. New method of investigating the variation of the magnetic qualities of iron with temperature, 250.
Porter, F. B. Testing the insulation and resistance of street railway lines, 61*.
Precht, J. Experiments with cathode and Röntgen rays, 726*.

R.
Reeve, F. C. Small lighting plants, 672.
Reichmann, Fritz, and others. Experiments on induction with currents of high frequency at long distance, 732*, 755.
Ricks, G. W. D. Some tests on the variation of the constants of electricity supply meters, with temperature and with current, 246*, 303*, 356*.
Rosa, E. B. An electric curve tracer, 631*, 670.

S.
Sachs, Joseph. Is the fuse or the circuit breaker best suited for motor protection?, 354.
Schroeder, Ludwig. Accumulators in electric railway power stations, 731*.
Schuchart, R. F. Meters of to-day, 131.
Shepardson, G. D. 220-volt lamps, 120.
Sherwood, R. H., Jr., Bedell, F., and Chandler, R. E. Predetermination of the regulation of a transformer with non-inductive load, 190*.
Short, S. H. Electricity as a motive power on elevated railways, 159*.
Sprague, F. J. Multiple-unit electric railway system for the Chicago Alley Elevated Railroad, 155*.
Steinmetz, C. P. Mechanicville-Schenectady power transmission, 586*.
Stillwell, L. B. Niagara power, 40.
Sullivan, P. F. Municipal ownership and the operation of street railways, 487.
Swoope, C. W. Instruction in practical electricity at night schools, 351*.

T.
Talbot, J. E. Re-inspection of electrical fire risks, 636.
The Boston subway, 295*.
Taylor, I. A. Counter E. M. F. in the arc, 326.
Thayer, G. L. Utilization of exhaust steam, 130.
Thomson, Elihu. Liquid air as an insulator, 325.
Possibilities of liquid air in electrical work, 99.
Treat, R. B. and Esterline, J. W. A new magnetic testing apparatus, 696*.
Turnbull, W. R. Spectro-photometry of incandescent lamps, 43.

V.
Vreeland, H. H. Municipal ownership and operation of street railways, 332.

W.
Wheeler, S. S. Belt-type machines, 424*.
Willcox, F. W. Importance of quality in incandescent lamps, 698.
Relative value of 220-volt and 110-volt lamps, 388
Willyoung, E. G., and Harth, H. P. Conductivity measurements with a direct-reading conductivity bridge, 579*.
Wolcott, Townsend. The calculation of transformer efficiency, 362.
Woodbridge, J. E. An electrically operated bridge, 7*.
Electric elevator problems and some of their solutions, 165.